

DISARMAMENT

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Ballistic Missiles: Future Security Implications

Ballistic Missile Proliferation: Seeking Global Solutions to Regional Problems

Thomas G. Mahnken

As the war in the Persian Gulf has demonstrated, the spread of ballistic missiles holds potentially tragic consequences for regional stability. As the record of the Iran-Iraq war, the war in Afghanistan, and the war in the Persian Gulf shows, ballistic missiles have become a weapon of choice for States in the developing world. Striking quickly and without warning, they are the ideal terror weapon; the vulnerability of opponents to the weapon magnifies its impact. The former Director of the Central Intelligence Agency, William Webster, has testified that by the end of the decade 15 States in the developing world will possess ballistic missiles, and 6 of them will have intermediate-range ballistic missiles (IRBMs).¹ These weapons will be of increasing range and sophistication.

To date, efforts to control ballistic missiles have centred upon restricting the supply of missiles and missile components. Chief among these efforts has been the Missile Technology Control Régime (MTCR) which was an-

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nounced by Canada, the Federal Republic of Germany, France, Italy, Japan, the United Kingdom and the United States in 1987, and which has subsequently been joined by eight additional States. But an anti-proliferation policy that focuses upon the supply side will have limited efficacy. To be truly effective, anti-proliferation policy should be expanded to encompass measures to reduce the demand for ballistic missiles, including continued diplomatic efforts to encourage regional reconciliation and the deployment of anti-missile defences to limit the utility of the ballistic missile and discourage the proliferation of missile technology.

The Emerging Ballistic Missile Problem

Saddam Hussein's use of ballistic missiles against United States forces, Israel and Saudi Arabia, his possession of chemical and biological weapons, and his pursuit of a nuclear-weapon capability serve as a microcosm of the problems posed by the spread of weapons of mass destruction and their means of delivery. During the war in the Persian Gulf, Iraq launched 81 modified Scud missiles against United States forces, Israel and Saudi Arabia. While most were ineffective, a single strike on a United States barracks near Dhahran, Saudi Arabia, caused 28 deaths and 100 injuries, fully one third of all United States deaths in the Gulf war. Many other Scuds were aimed at civilian targets. The missile attacks had a political impact far beyond their military effectiveness, threatening both to broaden the war by bringing Israel into the conflict and to sap local support for the anti-Iraq coalition.

The pattern of terror attacks upon civilians was foreshadowed by Iraq's use of missiles during its war with Iran. The Soviet Union is responsible for supplying Saddam Hussein's régime with hundreds or even thousands of 300-km Scud B missiles. During the Iran-Iraq war, Iraq modi-

fired many of these Scuds to produce the 650-km Al-Hussein and 900-km Al-Abbas missiles. Some 190 Al-Hussein missiles were fired at Iranian cities from February to April 1988, causing approximately 2,000 Iranian casualties, evacuation of half the population of Tehran and a severe disruption in the Iranian war economy.² For one Iraqi analyst, the lesson of the conflict was clear:

"[T]he Iran-Iraq War ... conclusively proved and operationally demonstrated that land-to-land missiles could be effective weapons in armed combat or total war specifically, even if they are armed with conventional warheads."³

More likely, it was the effect such weapons had on an Iranian population already tired of the war and suffering from waning morale, rather than the limited destructiveness of the missiles themselves, which caused them to have an impact in the conflict.⁴

The Soviet-sponsored Afghan Government has also used ballistic missiles extensively. According to William Webster, over 1,000 Scud B missiles provided by Moscow have been used by the Afghan Government to punish and demoralize the mujahidin resistance.⁵ They were used extensively during the 1989 siege of Jalalabad, though their military value here too is suspect.⁶ The missiles are both easier for the poorly trained Afghan army to operate than aircraft, and, unlike aircraft, are invulnerable to anti-aircraft missiles such as the Stinger, which caused heavy losses among Soviet and Afghan aircraft after their introduction into the war.

The United States has also been the target of third-world ballistic missiles. In April 1986, following the United States air strike on the Libyan Arab Jamahiriya in response to terrorist attacks on United States citizens, Libya launched two Scud B missiles at the United States Coast Guard facility on Lampedusa, off the coast of Italy.⁷

Soviet-supplied Scuds and Frog rockets, aimed at both civilian and military targets, were also employed by Egypt and the Syrian Arab Republic against Israel during the Yom Kippur War.

While the United States and the Soviet Union are in the process of eliminating their intermediate-range missiles and are continuing to negotiate on significant reductions in their arsenals of intercontinental-range weapons, a growing number of States in the developing world are busy acquiring equivalent systems. Such States are acquiring ballistic missiles through three processes: purchase, modification and indigenous development.

To date, the most prominent phenomenon has been the purchase of complete missiles by States in the developing world from suppliers in the industrialized world. None the less, the purchase of complete missile systems is becoming more difficult with the advent and expansion of the MTCR. Particularly significant was the announcement in May 1990 that the Soviet Union would "observe the spirit and the guidelines of [the MTCR]" and that Moscow was "taking measures to restrict missile proliferation on a worldwide basis, including export controls".⁸ In fact, the Soviet Union has historically been the greatest source of ballistic missiles in the developing world: the USSR sold thousands of Frog, SS-21 and Scud B missiles to clients in the Middle East and Asia.⁹ American sales of ballistic missiles, by contrast, have been limited to the sale of a handful of short-range Lance and Honest John rockets to South Korea, Taiwan province of China, and Israel in the 1970s.¹⁰

While the United States, Europe, Japan and the Soviet Union have withdrawn from the missile market, new suppliers are stepping in to take their place. Of primary concern are China and North Korea. Missile sales by China, which is outside the MTCR framework, remain a

continuing concern. In 1988 China sold a number of its DF-3 IRBMs to Saudi Arabia. The longest-range missiles sold to the developing world, the Chinese missiles were a clear signal of Beijing's entrance into the ranks of major arms suppliers. More disturbing still are reports that China is developing the M-series of ballistic missiles with foreign funding for the purpose of export. The M-9, for instance, is a 600-km solid-fuel system first displayed in 1986.¹¹ There are indications that China may sell the M-series missiles to the Islamic Republic of Iran, the Syrian Arab Republic and possibly other States.¹²

North Korea is another emerging missile supplier. According to two experts in the field, North Korea managed to reverse-engineer Scuds obtained from Egypt with the aid of Chinese technical assistance and Iranian funding. P'yongyang has reportedly delivered indigenously-produced Scuds to Iran and Egypt, and may sell them to other customers as well.¹³

In addition, Brazil has shown an interest in producing missiles for export. Brazilian rocket and missile systems are derived from their Sonda series of sounding rockets. Brazil has already produced the Astros series of unguided rockets based on the Sonda I-III, and it is likely that the Sonda IV will be produced in a military version. Avibras and Orbita, a consortium of Engesa, Embraer and three smaller firms, each have plans for a series of ballistic missiles with ranges of up to a thousand kilometres.¹⁴ Brazil has negotiated with the Libyan Arab Jamahiriya over the sale of ballistic missiles,¹⁵ and more recently proposed developing two such missiles for the Islamic Republic of Iran, with ranges of 600 and 1,000 km.¹⁶

Another tier of States have modified missiles supplied by the industrial States. Iraq modified its arsenal of Soviet-supplied Scuds by decreasing the weight of their warhead and increasing the size of their fuel and oxidizer

tanks, producing the 650-km Al-Hussein and 900-km Al-Abbas missiles used during the War of the Cities with Iran and the war in the Persian Gulf against the United States-led Coalition. North Korea has also reportedly produced its own modification of the Scud, dubbed the Scud C, with a range of 500 km. It has been reported that P'yongyang intends to sell these missiles to the Libyan Arab Jamahiriya, the Syrian Arab Republic, the Islamic Republic of Iran, and Iraq. There have also been reports of a further North Korean Scud derivative, the Scud D, with a range of 1,000 km and improved accuracy.¹⁷ South Korea has also reportedly modified some of its United States-supplied Nike Hercules surface-to-air missiles (SAMs) to produce surface-to-surface missiles (SSMs).¹⁸

A number of technologically sophisticated States in the developing world are pursuing programmes to manufacture long-range ballistic missiles incorporating Western (and, increasingly, indigenous) technology. Many indigenous missile programmes build from previous programmes, including SAMs, sounding rockets, and space-launch vehicles (SLVs). There is a clear link between civilian space-launch vehicles and ballistic missile programmes. In fact, any SLV can be used in a surface-to-surface mode with the addition of a guidance-and-control package. A number of States, including China, Israel, the Soviet Union and the United States, have converted dedicated military missiles for use as civilian launch vehicles. Others, such as Brazil and India, have produced ballistic missiles which were developed as an outgrowth of civilian sounding rocket and SLV programmes.

A number of States in the developing world have also co-operated on missile projects. The most significant example has been co-operation between Argentina, Egypt and Iraq to construct the Condor II—a mobile, solid-fuel missile, which reportedly was to incorporate advanced

technology from the Pershing II.¹⁹ While the leaders of both Argentina and Egypt have announced the termination of the programme, they may continue to benefit from technology derived from it.

India has tested both the 150-km Prithvi and the 2,500-km Agni, the latter a derivative of its SLV-3 space-launch vehicle. If deployed, the Agni would give India the capability to strike targets throughout South Asia as well as much of China. Further, a number of Indian observers have noted that the Agni will possess the range to strike the United States base at Diego Garcia.²⁰ In addition, the technology for the Indian SLV programme could provide it with the capability to field an intercontinental ballistic missile within twenty years.

Israel, for its part, has tested the Jericho II missile with a 1,500 km range, and used a Jericho II with an added stage to launch its two experimental satellites into orbit. If deployed in a surface-to-surface mode, such a missile could have a range of 7,500 km, allowing Israel to target not only the Arab States and the Islamic Republic of Iran, but also much of the Western USSR.²¹ It is also believed that Israel has transferred technology from the Jericho II to South Africa.²²

Future Trends in Third-Party Ballistic Missile Forces

So far, the use of ballistic missiles has been confined to the use of inaccurate, short-range, conventional missiles purchased from the Soviet Union and China. In coming years, the threat posed by ballistic missiles is likely to grow in a number of areas as a result of the modernization of indigenous industrial infrastructures and an increase in the scientific and technical skill of their workforces.

Longer-range systems. Most missiles which have in the past been sold to the developing world have a relatively

limited range. A number of States, however, have programmes to develop missiles with a much longer range. India, Israel and Brazil, for example, are in the process of developing powerful space-launch vehicles which could be adapted for military missions. Other States will be able to follow the example of Iraq and significantly extend the range of present missile systems. These systems may allow States to broaden the scope of regional conflicts significantly. As regional Powers acquire longer-range systems, they will have an increasing capability both to project their influence beyond the region and to exclude outside Powers from local conflicts in particular and from regional affairs in general.

More accurate guidance. Current ballistic missiles in the developing world have limited accuracy owing to their relatively austere guidance systems. For example, the circular error probable (CEP)—the radius within which half of the missiles launched are likely to fall—of the Scud B is generally assessed to be one kilometre. That of Iraq's Al-Hussein and Al-Abbas missiles was probably significantly less owing to their increased range and to structural modifications to their airframes.²³ In the future, third-world ballistic-missile systems are likely to increase in accuracy because of technical improvements in their guidance systems. With access to advanced inertial navigation systems (INS), it is not unreasonable to assume that within the next twenty years a number of developing States will be able to field highly accurate missile systems. Within the next twenty years, highly accurate ring laser gyroscopes may also become available for use in missiles, leading to a significant increase in accuracy. Others will be able to manufacture less accurate systems indigenously. Should MTCR controls be expanded, States seeking ballistic missiles may be forced to produce their own guidance packages. Israel, Brazil and India have manufactured their own

systems. China may also enter the INS market. While its systems are less accurate than their American, European or Soviet counterparts, they may be attractive to those States that do not have the capacity to construct their own systems and that are locked out of access to more advanced systems by MTCR restrictions.

The use of more accurate guidance and control systems on third world ballistic missiles has the potential to multiply their lethality. This increase in accuracy will, therefore, also have a great impact on employment strategies, making counter-military strikes a feasible alternative to the destruction of civilian targets. This trend will be facilitated by the growing availability of commercial satellite imagery from systems such as LANDSAT and SPOT and, for the more advanced countries, of indigenous satellite reconnaissance capabilities.

More lethal warheads. While the use of ballistic missiles has, to date, been restricted to conventional high-explosive warheads, many States acquiring such weapons are also developing more lethal payloads. In addition to standard high-explosive warheads, missiles can be fitted with advanced conventional warheads containing such payloads as submunitions or fuel-air explosives, which could significantly enhance destructive effects, especially against targets such as airfields, supply depots, roads or railway-yards. Highly accurate Soviet theatre missiles armed with advanced conventional warheads were seen as a major threat to the North Atlantic Treaty Organization and provided an original impetus for the development of theatre missile defences in the mid-1980s.²⁴ Israel, for its part, has been concerned about the use of highly accurate Soviet-supplied SS-21s by the Syrian Arab Republic against Israeli airfields and mobilization centres.²⁵ India is reportedly investigating a range of such warheads, including pre-fragmented munitions, bomblets, minelets, and incendiary

warheads for its Prithvi and Agni missiles, though there are significant technological hurdles to be overcome.²⁶ Dr. V. S. Arunachalam, Scientific Adviser to the Indian Minister of Defence, has gone so far as to state:

"India is convinced that missiles provide an optimum option as weapons and their improved accuracy over long ranges make even nuclear warheads unnecessary."²⁷

Chemical and biological warheads may provide another attractive option to nations developing a ballistic delivery capability. Aimed against soft targets such as cities, airfields or unprotected troop concentrations, such weapons delivered without warning by missile could have a devastating effect, though they are highly sensitive to temperature, humidity, and wind speed and direction. The technology needed to construct chemical weapons is widespread, and that needed to deploy biological weapons is increasing. Of the States developing a ballistic missile capability, the Islamic Republic of Iran, Iraq, China, North Korea, India, Pakistan, the Syrian Arab Republic, Egypt, Israel, and the Libyan Arab Jamahiriya possess or are developing chemical warfare capabilities.²⁸ Indeed, the Syrian Arab Republic and North Korea are believed to possess chemical warheads for their ballistic missiles, and there is evidence that the Islamic Republic of Iran, Iraq, and the Libyan Arab Jamahiriya have development programmes for similar warheads.²⁹

Nuclear-armed ballistic missiles could devastate both civilian and military targets. Needless to say, high accuracy would not be required to destroy most targets. Not surprisingly, those States that are most eagerly attempting to develop a missile capability are also those with the most active nuclear programmes. William Webster has testified that four of the countries developing missile capabilities already have nuclear weapons or advanced nuclear-

weapons programmes. By the end of the decade, an additional four could develop similar capabilities.³⁰

Current Anti-Proliferation Policy

The growth of ballistic-missile capabilities demands a response. The MTCR announced in 1987 a set of co-ordinated export policies designed to limit the spread of missiles capable of delivering a 500-kg payload to a distance of 300 km. The MTCR export restrictions include a ban on the sale of missile-production facilities and a strong presumption to deny exports of complete delivery systems, including complete rocket systems, such as ballistic-missile systems, space-launch vehicles and sounding rockets; unmanned air-vehicle systems, including cruise-missile systems, drones and remotely-piloted vehicles; and the following major subsystems: individual rocket stages; re-entry vehicles; rocket engines; guidance sets; thrust vector controls; and warhead safing, arming, fusing and firing mechanisms (category I systems). In addition, the export of dual-use missile components (category II systems) is to be judged on a case-by-case basis.³¹

The assumption underlying such traditional supply-side anti-proliferation policy has been that while the denial of all technology that could be used to construct ballistic missiles, for instance, may not be possible, the denial of a handful of key components would be enough to halt a programme. Put another way, it has been hoped that export restrictions would be able to raise the cost of acquisition—political and economic—to a sufficiently high level to make it an unattractive option. However, the MTCR faces a number of limits on its ability to control exports. First, the existence of a cartel limiting supply raises the economic incentive for cheating among members. The Condor II programme is testimony to the willingness of European companies to violate their nations' export policies. Simi-

larly, experts from a wide range of countries have been implicated in the programme to upgrade Iraq's Scuds.³² Secondly, the incentive to cheat also fosters the establishment of new sources of supply outside the cartel. For instance, the removal of the Soviet Union from the missile export business because of both its signature of the Treaty between the United States and the USSR on the Elimination of Their Intermediate-Range and Shorter-Range Missiles and its acceptance of the MTCR restrictions has been a boon to such second-tier suppliers as North Korea. Thirdly, there remain significant differences in enforcement standards both within and between MTCR members. This is accentuated by the fact that the MTCR is an informal, voluntary association without an institutionalized arrangement to govern the interpretation of restrictions. While United States export policy for missile technology has been strict, its control of dual-use equipment has been less stringent. For other MTCR members, the control of both category I and category II transfers has been weaker. Such behaviour has significantly hindered efforts to halt the spread of ballistic-missile technology. For instance, United States and European firms are known to have supplied equipment that helped Iraq construct its Sa'ad-16 missile development complex.³³

Membership in the MTCR has expanded significantly in the four years since it was first announced. Australia, Belgium, Denmark, Luxembourg, the Netherlands, New Zealand, Norway and Spain have become formal members of the régime. As noted earlier, the Soviet Union has announced that it will observe the MTCR guidelines. Other European States have reportedly been consulted about MTCR membership.³⁴ Still, a number of key missile producers, such as China and North Korea, remain unlikely to join the régime, regardless of what incentives they may be given.

The MTCR is an important step towards slowing the spread of ballistic missile technology. The régime can be credited with slowing a number of ballistic missile programmes.³⁵ In addition, there is significant evidence that pressure by the United States and its allies may have led Argentina and Egypt to withdraw from the Condor II programme. In the end, however, supply-side policies will fail as a single solution to missile proliferation because they fail to address the root cause of the acquisition of such capabilities, namely the fact that rising regional Powers view the possession of such weapons as advantageous for the advancement of their individual national security interests. A number of developing States have shown considerable determination and tenacity in their attempt to acquire ballistic missiles, devoting a significant amount of scarce economic resources to the endeavour. Even if enforcement of the MTCR were perfect, the fact that regional Powers view ballistic missiles as important, both as symbols of their national will and as instruments of national policy, and the fact that they are acquiring increasing capabilities to manufacture advanced technology domestically, indicates that it will be difficult to halt the spread over the long term.

In order to meet the continuing challenge of stemming the spread of ballistic missile technology and of mitigating the consequences when it does proliferate, anti-proliferation policy needs to take on an added dimension, namely that of lowering the demand for such systems. Policies relating to demand can work in two ways: by lowering the perceived need for ballistic missiles, and by reducing the military utility of the ballistic missile.

Bilateral or regional initiatives to diffuse regional crises and make the outbreak of war less likely will raise the cost of possession and at the same time lessen the demand for ballistic missile technology. Three broad categories of diplomatic approaches are possible.

The hardest to achieve, though in the long run the most desirable, would be the comprehensive settlement of outstanding political issues. Regional political rivalries and enduring religious and ethnic animosities provide a strong incentive to acquire advanced military technology. Reducing tensions in these volatile areas will in turn decrease the perceived desirability of, and need for, such systems.

Less comprehensive, though still quite challenging, would be the negotiation of formal bilateral or multilateral agreements covering the possession, stockpiling and deployment of weapons of mass destruction and their means of delivery. Such measures could include agreements or treaties limiting the number, types and ranges of ballistic missile and aircraft systems; controlling mass-destruction warheads; and limiting or banning ballistic-missile tests.³⁶ The war in the Persian Gulf has given an impetus to efforts to control weapons of mass destruction and their means of delivery in the Middle East.³⁷ For example, a recent United Nations report on establishing a nuclear-weapon-free zone in the Middle East recommended a mutual missile freeze in the region.³⁸ However, the report also illustrates the difficulty involved in such an enterprise. Arms control measures are likely to be most feasible in cases where conflicts are bilateral and lack a recent history of animosity or violence; where parties to the conflict share common cultural values; and where proliferation is not far advanced. By contrast, arms control is liable to be exceedingly difficult in a multilateral context, especially one charged with tension or conflict. In general, arms control is easiest to achieve where it is least needed.

A third possibility involves the adoption of formal or informal confidence- and security-building measures (CSBMs). The United Nations can play a key role in such a process, acting as facilitator and mediator in such potentially explosive situations. A number of significant prece-

dents already exist. India and Pakistan have negotiated an agreement not to attack each other's nuclear facilities, and Argentina and Brazil have initiated on-site visits to each other's nuclear facilities. Further CSBMs could include information and intelligence exchanges, on-site inspection of defence production and space-launch facilities, and prior notification of missile tests.³⁹

A complementary approach to lowering the demand for ballistic missiles involves reducing the military utility of such weapons. Ballistic missile defence (BMD) could assume an important role in anti-proliferation policy. Extended nuclear deterrence has served as a key concept underpinning alliance relationships over the past four decades. With the deployment of ballistic missile defences, extended defence may become a key operative concept in collective security. The success of the United States Patriot anti-tactical ballistic missile (ATBM) in protecting both Saudi Arabia and Israel during the war in the Persian Gulf is vivid testimony to the potential effectiveness of anti-missile defences. The Patriot served a dual role: militarily, it protected Coalition forces and their host countries from attack by Iraqi missiles; politically, it provided reassurance in the face of Iraqi attempts at coercion. In the future, the transfer of defensive technology could become an important factor in providing both direct defence and political reassurance to States threatened by neighbours with ballistic missiles.

Ballistic missile defence offers an attractive option to States under threat of attack by ballistic missiles. Ground-based area theatre missile defence systems are likely to be costly. However, it is doubtful that they will be orders of magnitude more expensive than advanced air defence systems, which are being purchased in large numbers throughout the world. Indeed, BMD may be thought of as a form of extended air defence. Further, the deploy-

ment of BMD is likely to be both less costly and more stabilizing than the alternative: the acquisition of counter-vailing offensive capabilities, which could fan a sense of insecurity in an opponent and fuel a spiralling regional arms race.

The effectiveness of ground-based theatre missile defences would be greatly enhanced by the deployment of space-based early-warning sensors. The short flight times of most missiles which are spreading throughout the developing world make early detection crucial. Space-based platforms could play a key role in supporting defences. None the less, early warning satellites are clearly beyond the economic and technological means of all but the most advanced States. A co-operative régime holds the possibility of redressing this problem. A number of States have advanced proposals in the United Nations for the creation of international and regional satellite monitoring agencies, which would utilize multinational surveillance platforms to monitor arms control agreements. Similarly, the deployment of ground-based defences could be accompanied by the use of space-based sensors provided by the United States and the Soviet Union, alone or in concert, or by other Powers.

The deployment of missile defences may also play a key role in dissuading States in the developing world from acquiring ballistic missiles. Ballistic missiles have enjoyed a privileged position as the only weapon against which there is no deployed defence. The fielding of active defences will substantially reduce the effectiveness of the ballistic missile as both a weapon and an instrument of coercion. Ballistic missile programmes are inherently uncertain enterprises, consuming significant economic and human resources. BMD may therefore reduce the desirability of the ballistic missile as a weapon of choice for States in the developing world. BMD alone cannot solve

the problems posed by the proliferation of weapons of mass destruction and their means of delivery. However, the deployment of defences will foreclose what is currently an easy option for States seeking a coercive capability and may channel third-world arms purchases down less destabilizing paths.

The war in the Persian Gulf represents a turning-point in international relations, a triumph of collective security and a warning to potential regional hegemony worldwide. However, the spread of weapons of mass destruction and their means of delivery will continue to jeopardize regional stability. Such threats are likely to increase in the future, owing to both the expanding list of producers of missile technology and the growing lethality of such weapons. While the trend cannot be halted altogether, the adoption of a balanced non-proliferation agenda, one based on restricting the supply of, and reducing demand for, such weapons, holds the promise of both limiting the spread of advanced military technology and of channelling such proliferation as does occur along less destabilizing paths.

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Proliferation of Missile Capability

Benoit F. Morel

Introduction

The proliferation of missiles in the third world has become a major source of concern. Australia, Canada, Denmark, France, Germany, Italy, Japan, New Zealand, Norway, Spain, the United Kingdom, the United States and the Benelux countries have joined efforts to counter this trend under the Missile Technology Control Régime (MTCR) established in 1987.

Most of those concerns, however, are focused on the proliferation of ballistic missiles. They tend to have a long range and a very high penetrability. They can be used as delivery vehicles of weapons of mass destruction such as nuclear or chemical weapons. They were used during the Iran-Iraq war and more recently in the war in the Persian Gulf.

It should be emphasized that ballistic missiles are only one class of high-technology weapons the proliferation of which in the third world is bound to affect international security. Cruise missiles and guided missiles such as the man-carried air defence interceptor Stingers are other classes of weapons with the same potentiality. The significance of guided missiles such as the Stingers may be judged

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by the fact that they had apparently a more decisive impact on the outcome of the Afghan conflict than the Iraqi Scud missiles in the conflicts where they were used.

The proliferation of cruise missiles should also be a legitimate source of concern. Using the commercially available global positioning system (GPS) technology,¹ it is easier today for a third world country to design a cruise missile with an accuracy of 100 metres, than a ballistic missile of the same accuracy.

Missiles are weapons with a high capacity to penetrate enemy territory. Before the war in the Persian Gulf, there was no credible defence against them. The war has been the first occasion on which an anti-tactical ballistic missile (ATBM) system—the Patriot—demonstrated some real although limited ATBM capability. The defence footprint (area defended) of the Patriot was very limited. The primary significance of a successful interception of an incoming missile was its political—not its military—effect. However, the Patriot did demonstrate its ability to defend its defence footprint reasonably well. The era of ATBM capability is upon us.

Because of their lack of accuracy the Scuds were militarily insignificant in the Persian Gulf war. To have a significant military value, missiles should have an accuracy matching the lethal radius of their warhead. The CEP (the standard measurement of a missile's accuracy²) of the Iraqi Scuds (at best hundreds of metres) was very large relative to the damage that could be inflicted by the 250 kilograms of explosive it was delivering. This forced Iraq to aim at soft targets, such as cities. In a sense, the less accurate missiles are more of a concern because they can be effective only if they carry weapons with a large lethal radius such as nuclear weapons, or if they are targeted against cities and civilians, whereas accurate long-range weapons arguably fall into the more legitimate category of strategic weapons,

which can be used for deep strike against military targets. The MTCR cannot make this distinction.

The purpose of the MTCR is to contain the spread of missile capability by denying third world countries access to missile technology. The MTCR countries cannot do more than co-operatively control their export of the relevant technology. Some important missile producers have not joined that effort, among them the Soviet Union. The USSR has provided countries in the Middle East—notably Iraq and the Syrian Arab Republic—with a large number of tactical ballistic missiles. China is another country which does not seem to share the concerns of the MTCR countries and has exported missiles, some with a range in excess of 1,000 kilometres.³ It is conceivable that these countries will be persuaded to join the MTCR. That would strengthen the MTCR significantly, but this will not solve the problem raised by the proliferation of missiles permanently, and for reasons we shall discuss in this paper this will not create a satisfactory situation. The MTCR will also suffer from trying to deny to third world countries weapon systems that some members such as the United States have in their arsenal, and are still actively developing. Some third world countries (India, Pakistan, Argentina, Brazil, to name a few) are currently developing that kind of technology. This demonstrates the fact that the spread of technological capabilities is inevitable. Virtually all the countries of the world will, ultimately, have the capability of doing what is today the privilege of a few. The MTCR can only buy time by delaying the process of proliferation. It has to be supplemented by policy initiatives associating the countries that do not belong to the MTCR, whose purpose would be to establish a world order in which long-range weapons of mass destruction are not a threat.

What is "Missile Capability"?

A ballistic missile uses a rocket engine for the first phase of its flight, and then it follows a "ballistic trajectory". That is, it has the trajectory of a dead object falling back. The accuracy of the missile is determined by its "guidance system". The guidance system is a device which analyses the movement of the missiles by detecting the forces applied on the missiles. It is supposed to detect with high sensitivity and precision the deviations from an ideal trajectory and provide adequate corrections. The corrections are applied through fins or thrust vector control.

Both phases of guidance are quite delicate: detection of deviation from the ideal path and implementation of the corrections. A missile undergoes high acceleration, and travels through the atmosphere at very high velocity. It is subjected to very large forces. Small errors in the value or angle of its velocities translate into large errors at the end of its trajectory. The guidance system must be able to detect very small signals, in the midst of great noise. Modern systems use laser gyroscopes and require high processing capabilities.⁴ Implementing corrections is also a delicate operation.⁵ Compared to the guidance system, the rocket engine technology is probably easier to develop. A lot of information is publicly available on rocket engines and on missile kinematics and stability.

Countries such as Brazil or India could not be totally denied the ability to build a missile through export control, although it might slow their progress. The development of guidance systems is the main area in which they might find it difficult to make progress on their own. This is an area in which export control could make a difference. It seems that the possibility that missiles could be used in a nuclear mode is the major source of concern with missile proliferation. The consequence of MTCR policies on Brazilian or Indian missiles will not be to prevent Brazil from building

missiles, but to make sure that their first missiles will not be very accurate, that is, that they could be used efficiently only against civilian targets or as delivery vehicles for weapons of mass destruction such as nuclear weapons. The MTCR might not be very effective at preventing a country from acquiring the delivery vehicles for nuclear weapons, because these do not need to be very accurate in order to be effective.

If a third world country wanted to acquire a conventional long-range strike capability, it would be able to do that more easily with cruise missiles than with ballistic missiles.⁶ What cruise missile capability entails is of a totally different nature. A cruise missile is basically an unmanned aeroplane. United States cruise missiles are very accurate, very penetrable and offer a large variety of launching techniques as compared to ballistic missiles. They can be launched from the ground, surface ships, submarines, or aeroplanes. As delivery vehicles for weapons, they are more flexible than ballistic missiles. Like ballistic missiles, they can be used for delivery of unitary payloads, but they can also, more easily than ballistic missiles, deliver submunitions and disperse chemical weapons. The guidance system of United States cruise missiles uses the terrain contour recognition technique called TERCOM. TERCOM compares the profile of the terrain it flies over with a profile stored in its memory. To be operational it requires a wealth of intelligence data on the target country and high processing capability. This kind of technology is out of reach for most countries. (The United States is the only country using such a technique.)

The appearance of the global positioning system has changed that situation. It is now theoretically possible to equip those missiles with a GPS receiver, commercially available, far cheaper than TERCOM, which tells the missile its position within one hundred metres. Countries able

to build aeroplanes could even more easily build a cruise missile. The control of the flight requires a radar altimetre, coupled with a servo-mechanism that controls the flight, which seems less stressful technologically than is the guidance system required for a ballistic missile. Also, cruise missiles do not require re-entry vehicles that must withstand very severe temperature conditions. In common with ballistic missiles, cruise missiles require warheads. The warhead is one component of cruise and ballistic missiles which cannot be deployed by means of dual-use technology, but is very specific to military applications.

Another incentive for third world countries to be interested in cruise missiles instead of ballistic missiles is the advent of the anti-tactical ballistic missile capability. Now that the Patriot has demonstrated a limited, but significant, ATBM capability in the Persian Gulf war, the United States and perhaps other countries will certainly feel encouraged to work on ATBMs.

On the other hand, the emergence of ATBMs does not yet signal the end of the era of ballistic missiles. The Patriot has demonstrated only a very limited ATBM capability. It will take a long time to upgrade Patriot capability, and for a long time only a very few countries will be able to afford that kind of capability. Furthermore, long-range ballistic missiles will remain difficult to intercept for a very long time and it is possible to conceive countermeasures to ATBMs, and penetration aids, which might defeat the next generation of ATBMs. The use of tactical ballistic missiles might, however, involve measures to counter ATBM defence. There is no efficient defence against cruise missiles.⁷

The interception of cruise missiles requires a completely different architecture from ballistic missiles. Unlike that of ballistic missiles, the launching of a cruise does not send a very large signal easily detectable from space.⁸ The detection of cruise missiles cannot be made from air-de-

fence ground-based radars. The cruise missiles fly too low. The detection requires airborne radars such as airborne warning and control systems (AWACS), able to distinguish a cruise missile from above, that is, from the background noise. This is very difficult and requires high processing capabilities. There are reasons to believe that cruise missiles will remain very penetrable for some time to come.

Discussion of policies of export control tend to use the concept of dual-use technology in a simplistic way. Any technology or technological concept which finds a military and civilian application belongs to the elusive family of "dual-use" technologies. Some aspects of ballistic missile technology may be said to be "dual-use": the technology for space launchers and re-entry vehicles is of direct use for ballistic missiles. In fact, ballistic missiles were originally developed together with the space programme in the Soviet Union, and some Soviet launchers today use stages derived directly from ballistic missiles. Containing the spread of ballistic missile technology will constrain the space programmes of third world countries: if the MTCR were successful, the space programmes of third world countries would not deal with launchers at all, only with payloads and non-MTCR countries would be obliged to use the services of one of the MTCR countries offering launches.

In the same way, cruise-missile technology has a lot in common with aeroplanes. A policy of technology export control denying third world countries access to cruise missile technology will almost inevitably deny them access to aeroplane manufacturing technology. If the control is pushed to its limit, it might even complicate the purchase of commercial airplanes, since these will be equipped with GPS receivers. On the other hand, the control could focus on specific components of cruise missiles which do not have

any civilian application, instead of dealing with all the components included in a cruise missile.

Countries Developing Those Capabilities

Of fundamental importance for the discussion of the proliferation of missile technology is the extent of its spread and the dynamics of its diffusion. We follow the tradition of discussing it by country, because we do not know of a better approach. It provides a unique insight into the variety of situations and the political framework in which the non-proliferation régime will be applied. The most notable countries that tend to be associated in one way or the other with missile proliferation are (in alphabetical order): Afghanistan (which possesses a not negligible amount of Soviet missiles and used them in unprecedented numbers against the mujahidins);⁹ Algeria (which has a few Soviet Frog missiles); Argentina (which is potentially a producer); Brazil (which also has a missile programme); China; Cuba (which also has short-range Soviet missiles); Egypt (which has an ongoing programme of development of ballistic missiles); India (which also has a space programme); Indonesia (which has a small rocket programme); the Islamic Republic of Iran (which is actively trying to acquire missiles); Iraq (whose capabilities were seriously set back during the war in the Persian Gulf); Israel (which has an advanced programme); North Korea (which has Soviet missiles); South Korea (which is sometimes suspected of trying to develop missiles); the Libyan Arab Jamahiriya (which tries to purchase and sell, and is suspected of developing them); Pakistan (which is supposed to have tested some missiles); Saudi Arabia (which has purchased some Chinese long-range missiles); the Soviet Union (which has been a major source of missiles), and the Syrian Arab Republic (which possesses Soviet missiles and seems to be interested in acquiring others).

Of greater interest for our discussion are the countries which are either developing themselves a missile capability or directly supporting it. They are: Argentina, Brazil, China, Egypt, India, Israel, the Libyan Arab Jamahiriya, Pakistan and the Syrian Arab Republic.

A programme for the development of a missile capability is a serious endeavour, and one which takes several years. It requires resources and a lasting commitment. The amount of resources required is such that some countries have combined their efforts in some programmes. They do not produce any tangible results for several years. The motivation behind this effort has a direct bearing on its content. The United States (through the National Aeronautics and Space Administration) engaged in co-operative programmes of rocket development with some of those countries, namely: Argentina, Brazil, India and Pakistan.¹⁰

As regards Israel, this activity is vital for its security. Because of its precarious relations with its neighbours, Israel needs to maintain a technological edge over its neighbours, at least in areas as vital as long-range strike weapons. Israel has a very active programme of missile development, ATBMs (Arrow), and even space launchers. The state of advancement of Israeli missile technology is comparable to that of the most advanced countries. There is little that the MTCR countries could do (if they were so inclined), that could affect the pace of the Israeli missile modernization programmes.¹¹

The Syrian Arab Republic does not have the capability to develop missiles. It depends on the rest of the world for its supply. Furthermore, it seems that Syria does not have the resources to initiate a significant missile development programme. On the other hand, it has shown a very active interest in ballistic missiles, and there is little that Syria could do to circumvent an efficient régime of missile non-proliferation. The possibility that such an export con-

trol régime could be effectively implemented must be a major preoccupation for a neighbour of Israel such as Syria, which does not have its own capabilities.

The Libyan Arab Jamahiriya has a lot in common with Syria, but there are a few differences: it is not a direct neighbour of Israel and it has more resources. In fact, Libya has in the past tried to develop some autonomous capabilities by using some German know-how.¹² On the other hand, Libya suffered from an international isolation, bordering on a boycott, for its alleged support of some terrorist movements. Libyan internal activities have been submitted to a level of scrutiny that is probably higher than that of any other country. This programme is still going on, despite international interference: the German company Otrag, which is helping Libya, has been under pressure from the German Government to leave Libya, but this programme, although not negligible, does not have the potential to lead to the establishment of a significant infrastructure, and to provide Libya with a significant missile capability in the foreseeable future. For Libya, the final severance of its ties with the German company does not depend on MTCR agreements. It depends on the enforcement of German laws. Without German technological support, the prospects of the Libyan missile programme do not look good.

The Egyptian activities in this area seem more promising. The Egyptian missile programme dates back to the Nasser years (the early 1960s). At that time its political connotation was far more threatening to the security of the region than is the case today. The Egyptian programme today does not seem to proceed from a strategic decision to develop missile capabilities systematically in order to provide Egypt with new weapons that will change its military posture. It seems to proceed rather from the logic of military modernization. Given the size of the Egyptian military forces and their composition, and given the secu-

rity environment of Egypt, it is natural that the Egyptian military should be interested in missiles. They are not trying to purchase missiles quickly, but rather to develop autonomous capabilities. The programme seems to express a prophylactic, long-term policy. The Egyptians cannot expect the support of any MTCR country in that endeavour. They are engaged in some form of collaboration with Argentina in missile technology. The exact content of this association is difficult to identify precisely. These two countries are not perceived as "problem countries", so it is interesting to see that they insist on conducting a policy which could be perceived as undermining world stability, and which inspires serious opposition among the MTCR countries. From the perspective of Egypt there is a completely different rationality. What is good for the MTCR is not necessarily good for Egypt. And a prudent policy for the Egyptians might be to avoid involvement with the MTCR. The problem with the MTCR is that this is probably true for many other countries.

Argentina and Brazil represent countries with high potentialities justifying great ambitions for the long term. The level of education of their élite is as high as in any advanced country. One would expect the Governments of those countries to have strong incentives to have budding programmes in areas such as nuclear, space or missile technology. On the other hand, the state of their economy does not allow them to have large-scale programmes. Argentina's Condor missile programme seems to have been developed largely on the basis of the importing of solid fuel technologies from Germany and financial help from Iraq, among other factors.¹³ The state of technological advancement of Argentina is such that it will not always depend on the ability of German companies for the development of its programme. Argentina is able to learn and develop those capabilities by itself. The precedent of what

happened with Iraq, and of the collaboration that is probably going on with Egypt proves that Argentina will have the opportunity (if and when it has acquired the capability) to defeat the purpose of the MTCR.

The same is true of Brazil. Brazil has ongoing space and missile programmes. One should expect the technology programmes in Brazil to grow at a varied pace (influenced somewhat perhaps by the economic and financial oscillations of the country). Technology is vital for the development and future of Brazil. It would be less than rational for a Brazilian Government to constrain technology programmes for political reasons.

Brazil might also be an objective hindrance to the success of the MTCR. Brazil developed ties for the export of its missile technology with Iraq, Saudi Arabia and the Libyan Arab Jamahiriya.¹⁴ The fact that countries such as Brazil and Argentina are prepared to collaborate on a technology as sensitive as missile technology with countries of the Middle East quite rightly gives rise to questions. The Persian Gulf war coincided with (or triggered) a reappraisal by many countries of the problems that the instability in the Middle East raises for international security. One could hope that countries that do not belong to that region will consider their responsibility not to contribute to aggravation of the situation. Otherwise they could expect to be submitted to strong pressure to do so.

India and Pakistan tend to be discussed together because they are the two major components of a problematic region: South Asia. But the activities of these two countries in missile technology are quite different, in size and content.

India is a large country. Despite the fact that its per capita gross national product is small, India can afford a space programme, and can have aspirations of being a local super-Power. It has an operational launch vehicle, the

SLV-3, which is, however, modest by comparison with most other existing launchers—it can put a payload of only 80 pounds in orbit, but it uses a four-stage series of solid propellant rockets. India does not officially have operational missiles, but clearly it does not need the help of foreign countries to be able to provide itself with ballistic missiles.

Pakistan has developed close relations with an improbable mix of countries: China and the United States. Their activities in missile technology, programmes and testing are strongly influenced by the nature of their relation with those allies each of which pursues a different goal in its alliance with Pakistan. For the United States, the proximity of the Soviet Union and Afghanistan is the main source of interest in Pakistan, whereas for China the competition for local influence with India is the main motivation. The relevance of the military programmes of Pakistan is measured by their consequences on their military posture *vis-à-vis* India. The United States has far less interest in armed conflicts between India and Pakistan than does China. And the contribution of the United States to Pakistan's rocket programme is small and for civilian purposes. The United States is not interested in seeing Pakistan acquire a huge ballistic missile arsenal. The Chinese attitude on that subject is quite different. China is suspected of all sorts of dubious contributions to the Pakistani programmes in missile and even nuclear weapon technology.

China could become an important factor in the proliferation of missile technology. Not only does China have launchers and missiles of many different ranges, it seems to be very inclined to export them. China has purportedly created companies dedicated to arms export.¹⁵ In the words of a senior officer in charge of arms export:

"We are determined to devote ourselves to raising funds for promoting the four modernizations of China. This is a glorious mission that should claim credence above all others. . . ."

China has raised serious concerns by selling CSS-2's to Saudi Arabia, and more recently by giving the impression that it is close to selling M-9s to the Syrian Arab Republic. China's need for hard currency seems to be the major source of concern as regards its attitude to trying to meet the potential demand of various countries for missiles and missile technology.

The countries discussed follow different kinds of logic in their attitude towards missile technology. For some countries, the pursuit of missile capability expresses their immediate security needs. This is the case for Israel for example. Others, like Argentina or Brazil, seem to pursue objectives more loosely related to their security. The goals of the MTCR will hardly coincide with what the countries we discussed consider their interests. Other countries not interested in missile technology will suddenly find the purchase of some technologies more difficult. It might not always be easy to convince them that their security is better served in that way, because it slows down the spread of missile technology. In other words, some of the countries acquiring or developing missile capabilities might legitimately resent the MTCR, and the countries not even interested in missile technology might resent the MTCR even more. That means that the MTCR could easily become a source of contention between the North and the South. This would be the most self-defeating outcome of the MTCR.

Critique of the MTCR

The proliferation of missile capability is generally discussed in the context of the proliferation of nuclear or

chemical weapons. The degree of missile capability is often assessed in parallel with the nuclear or chemical capability of the country concerned, mostly the nuclear capability. The policy of Iraq under the régime of Saddam Hussein played a very important role in generating worldwide concerns on that subject.

Clearly there is a scary synergism between missile capability and nuclear (or to a lesser extent chemical) proliferation. It is important to acknowledge the fact that if one could decouple the problems raised by nuclear proliferation from the debate on the proliferation of missiles, the debate would have a totally different character.

One lesson of the Persian Gulf war was that, equipped with conventional warheads, Scuds were basically irrelevant militarily. And despite their visibility, they did not achieve much politically. The fact that the United States used some of its tactical missile ATACMS during that conflict went completely unnoticed. But the United States cruise missiles are credited with having made a major contribution to the outcome of the conflict. This suggests that maybe the lesson of the Persian Gulf conflict is that the military value of conventional tactical ballistic missiles is questionable whereas conventional cruise missiles can clearly be very efficient weapons. Countries for which the possession of conventional cruise missiles could make a difference will react negatively to a régime denying them access to a weapon system which has demonstrated its worth. One can expect that such countries will not co-operate in ensuring the success of that régime.

In the spirit of trying to make the MTCR less obnoxious to the third world, no effort should be spared to make it as sophisticated and acceptable as possible. One area in which there is room for improvement is in the use of the concept of "dual-use" technology. Part of missile technology belongs to what is referred to as "dual-use technolo-

gies". The concept of dual-use technologies can be very misleading in discussions on technology transfer. A "dual-use technology" has a civilian and a military application. But both applications can (and in general do) imply a large effort of development, of a very different nature. The difference between a car and a tank illustrates the kind of difference. A tank is not a cost-effective civilian object, and a car is of little military value. Both are the result of a serious effort to optimize their specific applications. Military requirements tend to be quite different from civilian requirements. So the military and civilian exploitation of "dual-use" technologies refer in most cases to very different activities. There are a few technologies which are dual-use in the superficial sense in which the word tends to be used. As we have noticed, the rocket engines of launchers and ballistic missiles are a case in point. But the demands put on the guidance systems of ballistic missiles have no civilian equivalent, the airframe, or body of cruise missiles has hardly any legitimate civilian use, warheads can hardly be construed as dual-use, and so on.

One drawback to resisting any attempt to refine the concept of "dual use" is that it can aggravate the negative impact of a policy of restriction of technology transfer and it will contribute to antagonizing the countries to which the export control will apply. Furthermore, restraining the transfer of technology can only have a negative impact on the economies of all the countries involved. It is theoretically possible to improve this situation by accepting the intellectual challenge of refining its application on dual-use technology. That would mean opening further the black box of technology, accepting a case-to-case approach. Little or no effort has been made so far to gain this additional insight into the anatomy of dual-use technologies. By refining the application of that kind of policy on dual-use technologies, one could make the corresponding policy

more intellectually respectable and most probably soften its negative impact significantly. This refinement should take place at two levels: conceptual and translation into policy. At the conceptual level, what is needed and possible is to get a more "dynamic" approach to technology proliferation and dual uses. The interface between technologies and economic development should be scrutinized. The same technology does not make the same economic sense in different countries. There is room for a lot of refinement at the theoretical level. There is no excuse for limiting the degree of sophistication at the conceptual level. At the policy level however, a completely different logic pertains. At that level too much sophistication could result in impeding the implementability of a policy or in making it lose its coherence. I would contend, however, that keeping to simplistic concepts in the name of pragmatism is not a good approach.

The major flaw in the MTCR approach, which will no doubt guarantee that it could never be a long-term solution, is the fact that the United States and the other countries constituting the MTCR club possess the weaponry they want to deny to the rest of the world. And they do not intend to get rid of their weapons, quite the contrary: one can expect that not only will the United States keep its arsenal of missiles, but it will actively improve them, work on ATBMs, and work at maintaining a technological advantage as large as possible. Seen from the perspective of United States defence policy, this is at least as legitimate as it is for Brazil or Argentina to maintain an active missile programme with international ramifications.

Any régime of technological control is transient in nature. The progress of technology is an irresistible process which will not be stopped by any form of legislation, national or international. The spread and advances of technology constitute a dynamic system. What régimes like the

MTCR can achieve at best is to slow down some trends, such as the speed of the spread of missile technology. As we mentioned before, another effect will be to encourage some countries of the third world to develop autonomous capabilities, thereby limiting further the ability of the MTCR countries to have any impact on the proliferation of technology.

The political environment that the MTCR will create is uncertain. At best the MTCR countries will be successful at convincing third world countries that the MTCR serves their interests. That means that special provisions will be found to alleviate the potential negative impact of the MTCR. In that rosy scenario the MTCR could be part of a "new world order", based on the co-operation of most countries for its success. More realistically, the MTCR will cause most third world countries to have serious reservations. It will take some convincing to gain their co-operation and their support will be at best mercenary and provisional. Depending on the way the MTCR is implemented and enforced it might encourage joint ventures between third world nations targeted against the intentions of the MTCR countries. In other words, legitimate concerns regarding the threat that weapons of mass destruction could be used in the third world could create the conditions for a polarization between the North and the South. Clearly, the MTCR will have to be supplemented by other initiatives.

A theoretical possibility—one which is not a realistic option—is an international ban on missile technology. This would be the equivalent for missile technology of the draft comprehensive convention on chemical weapons.

The notion that it would be impossible to enforce such a treaty is only true superficially. If no country had the right to develop and procure long-range missiles, it would not be easy to circumvent such a treaty. The development

of such missiles is not easy. It requires a serious programme. Nations which are denied by treaty the right to possess such missiles will be very anxious to see the other nations complying. This would make circumvention difficult. As compared to the chemical weapons convention, there is no indication that a missile convention would be particularly difficult to implement. On the other hand, many countries already have hundreds of such weapons, and they will not agree to destroy them. This is the real problem. Since the members of the MTCR are among those countries, the moral bases of their desire to prevent proliferation are low.

The MTCR is objectionable morally; it does not solve efficiently the problem it addresses and it could contribute to dividing the world. It has to be improved in terms of its basic precepts if it is to become more intellectually respectable; but it is necessary. A world without a MTCR would be even worse.

The Treaty on the Non-Proliferation of Nuclear Weapons (NPT) was designed to pave the way to a worldwide régime of nuclear disarmament. Concretely it has sanctified a very imperfect world a bit better than it would have been otherwise. The MTCR, like the NPT, belongs to a class of fixes that, at best, prevent the world from becoming even more dangerous. This is achieved by trying to prevent natural evolution and by trying to contain it through arrangements that are inherently unstable. The active co-operation of several nations is needed to maintain the fragile régime thus defined. They will have to be prepared to react to a variety of situations, and will have to hope that time will create the conditions for more international co-operation and trust.

The belief that the proliferation of missile technology can be solved intellectually in a satisfactory way is as yet unjustified. Technology can both benefit and harm

mankind. Making sure that it does only the former is impossible. It will take far more than the MTCR to achieve that. The MTCR cannot be better than a suboptimal fix in a situation full of real dangers.

Conclusion

The proliferation of missile capability is a very worrisome development. It is a serious problem still in search of a solution. Non-proliferation régimes such as the MTCR do not have the potential to provide a long-term solution because they cannot stop third world countries from developing an autonomous capability. A policy of technology transfer based on the present simplistic interpretation of what "dual-use technology" entails could come with a very large cost. Luckily for the supporters of the policy, the cost is difficult to assess and can be denied, because its assessment requires a comparison with a hypothetical situation.

The benefit, on the other hand, is easier to appreciate. What the MTCR could achieve is to buy precious time. As bad as a MTCR can be, there does not seem to be any alternative to it. The proliferation of missile capability presents the world with a real problem. The absence of a satisfactory solution creates a real pressure. We are presented with an uncomfortable dilemma, which should be dealt with as a dilemma. One cannot be comfortable with the proposed solution of a MTCR, but it is an inevitable component of tomorrow's policy. The challenge is to give the best possible face to a MTCR, and to make it work as well as possible.

The MTCR does not include all the countries with advanced missile capability. Among the countries not belonging to the MTCR one finds countries such as Sweden and countries with a record such as that of the USSR and China. The efficiency of what a MTCR could achieve

depends on the co-operation of those countries. For some of them, such as China, this support might come at a cost.

Even if these countries co-operate fully, that would still not make a MTCR a flawless approach. It would be offensive in that it would deny some third world countries the ability to pursue some technological avenues they consider favourable for their development. Ideally, a MTCR should define a "flexible" régime, that is, a régime that would take into account the facts that a component does not *per se* make a whole missile, that most dual-use technologies require separate developments for their military and civilian exploitation, and that in some cases it would be impossible to conceal completely an attempt to exploit them militarily.

A flexible MTCR régime would certainly reduce significantly the indirect cost of the implementation of the régime of control of technology transfer. Whatever those savings (it is impossible to assess them), the notion of a flexible régime is unacceptable because it opens the door to abuses and it is a bureaucratic impossibility: it supposes a "clever regulation" and a bureaucracy able to enforce it: two propositions, we are told, that put us in the realm of utopia. If we accept that logic, the choice today is between an inept and costly MTCR or letting the world become a very dangerous place fast.

As it is designed, the MTCR will contribute to emphasizing the divide between North and South, and advanced societies and the third world. It could apparently only aggravate a division of the world which is much more arbitrary than meets the eyes, and which can only breed trouble for the future. It is critical that the MTCR be designed in such a way that third world countries can find in it protection for their interests. Although this is clearly essential it goes against the grain of what the MTCR is designed to be.

Proposing a world where some countries protect their privilege of possessing specific weapons systems (and use them when needed, as was the case in the war in the Persian Gulf), while other countries are denied the possession of the same weapons is in the long run an untenable proposition. Outlawing those weapons altogether would be more satisfactory. The idea of outlawing ballistic missiles, or at least a class of them, is a heresy today.¹⁶ One day, denying the rest of the world access to those missiles will cease to be an option. Outlawing them might then be seen as the best solution. In that perspective it might be prudent not to wait too long before assessing the pros and cons of such a régime.

Notes

- 1 The global positioning system (GPS) comprises a constellation of satellites which emits signals that can be used for navigation. For a few thousand dollars, it is possible to purchase GPS receivers which tell the position anywhere on Earth within a hundred metres.
- 2 The "circle of equal probability", sometimes referred to by the oxymoron "circular error probable" (CEP), is an imaginary circle around the target in which the missile has a 50 per cent probability of falling.
- 3 It sold CSS-2's (which have a range of around 1,550 nautical miles) to Saudi Arabia.
- 4 Aeroplanes are also equipped with laser gyros using the "Sagnac effect", either as laser gyros or with fibre-optics technology. Some are available commercially. If they were coupled to a processor able to interpret the data perfectly, they would give ballistic missiles an accuracy of from several hundred yards to a few hundred kilometres.
- 5 The corrections themselves consist in subtle changes in the angle of the fins, or the thrust. The effect of the fins has to be computed precisely: it depends on the altitude and velocity. The positions of the centre of gravity and of the centre of pressure (both vary with time) have to be known precisely.
- 6 Although this point is not entirely uncontroversial, the cruise missiles seem to have contributed significantly to the success of the United States against Iraq. Those cruise missiles had a circular error probable (CEP) of 15 metres. A third world coun-

- try, using a GPS receiver, could not hope to have an accuracy of better than 100 metres.
- 7 Cruise missiles fly very low. They are under the horizon of ground-based radars until they are very close to the radar. Airborne detection (with an airborne warning and control system (AWACS)) is necessary. This is difficult as it requires a high-discrimination capability against the clutter. Then interceptors have to be sent against them and have to see them.
- 8 Some claim that the plume of cruise missiles can be seen from space. This is doubtful, as their infrared signature could be expected to be smaller than that of aeroplanes. At best they could be detected with much less reliability than the plume of a ballistic missile because the signal is significantly smaller, and its location far less predictable.
- 9 Aaron Karp, in *SIPRI Yearbook on World Armaments and Disarmament*, 1990, p. 378.
- 10 Janne E. Nolan, *Trappings of Power, Ballistic Missiles in the Third World* (Washington, D.C., Brookings, 1991), p. 36.
- 11 Israel has apparently benefited from United States help in the past. Furthermore, even if Israel has not sold any ballistic missiles, it is reported to have provided China with its air-to-air missile Python. See C. Foss, in *Jane Defense Weekly*, 13 April 1991, p. 573.
- 12 Aaron Karp, in *SIPRI Yearbook on World Armaments and Disarmament*, 1989, p. 303.
- 13 Janne E. Nolan, *op. cit.*, p. 53.
- 14 Janne E. Nolan, *op. cit.*, p. 8.
- 15 J. Lewis, Hua Di and Xue Litai, "Beijing's defense establishment: solving the arms export enigma", in *International Security*, Spring 1991, p. 87.
- 16 Although to a large extent this is an irrelevant remark, one cannot but notice that in the Persian Gulf war, the United States did not seem to have extracted so much benefit from the use of ATACMs. Admittedly, this conflict might not have been a good one in which to check the possible efficiency of that kind of missile.

Proliferation of Ballistic Missiles and Regional Security

Zhuang Maocheng

The aggression against Kuwait and its annexation by Iraq last August led to the unusually fierce Persian Gulf war which broke out at the beginning of this year. During the war, as a result of the large-scale air attack by the multinational forces and the interception by the United States Patriot anti-tactical ballistic missile (ATBM) system, Iraq's Soviet-made Scud B missiles were rendered of little effect. Nevertheless, their repeated attacks on Israel and Saudi Arabia caused great fear among the local peoples. As ballistic missiles have been used several times in some regional conflicts since the 1970s, the international community has shown increasingly grave anxiety concerning the impact which the proliferation of ballistic missiles could have on regional security and therefore the demand to put a stop to their proliferation is becoming stronger day by day.

Historical Background and Status Quo

The proliferation of ballistic missiles is the product of the East-West cold war following the Second World War. On the basis of the V-2 used by Germany in the later stage of the Second World War, the United States and the

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Soviet Union respectively developed their first groups of ballistic missiles not long after the end of the war. Later on, owing to the changes in the situation in Europe, both sides caused a proliferation of the missiles first by making them available to their respective allies either by deploying missiles in the territory of their allies or by helping them to develop their own missiles.

The proliferation of ballistic missiles to the third world was also caused by the keen competition between the United States and the USSR for spheres of influence. As early as the late 1950s and early 1960s, the United States and the Soviet Union began to provide their respective friends with tactical ballistic missiles. Besides Turkey, a member of the North Atlantic Treaty Organization, the United States provided South Korea and Taiwan province of China with Honest John missiles, and some United States munitions corporations assisted Israel in developing ballistic missiles by itself. The Soviet Union, on its part, provided Algeria and Egypt with Frog-4 or Frog-5 missiles.¹ Along with the continued intensification of the Arab-Israeli conflicts and the outbreak of the third and fourth Middle East wars, the Soviet Union provided Egypt, the Syrian Arab Republic, the Libyan Arab Jamahiriya, Iraq and South Yemen with Frog-7 and Scud B missiles in the early 1970s while the United States agreed in 1975 to the emergency supply of 200 Lance missiles to Israel (to be delivered in the following year).

The precedents set by the United States and the USSR were followed by some Western countries. Quite a few Western European countries, while energetically developing their own missile technology, transferred missiles or missile technology to some third world countries or dispatched missile experts to help them design and develop ballistic missiles. All these practices have contributed significantly to missile proliferation since the 1970s. Up to

now, more than 20 countries and regions in the third world have possessed or are developing ballistic missiles and there are nearly 30 types of ballistic missiles which have already been deployed or are under development.

Today, there has been a proliferation of missiles to all parts of the world. The region most affected is beyond doubt the Middle East, where the most acute and complex contradictions and the most protracted and intense conflicts have existed. Judging from the trend of development of proliferation, although it is difficult for Iraq to continue to acquire and develop new ballistic missiles in a brief space of time under the restraint imposed by resolution 687 (1991) of the United Nations Security Council, the lessons drawn from the war in the Gulf may possibly enhance the desire of other small and medium-sized countries to develop and possess these missiles. What is more, not only would it be difficult to check the momentum of missile proliferation in the near future, but more new generations of missiles may appear and more and more countries may possess ballistic missiles.

Causes of Proliferation

As mentioned above, the proliferation of ballistic missiles has a history of more than three decades. It is not difficult for people to see that the proliferation of missiles came about primarily as a result of the East-West cold war and the intense competition between the two super-Powers. It was the United States and the Soviet Union that first allowed missiles and missile technology to proliferate in large quantities and to wide areas. To strengthen and expand their respective spheres of influence, they have competed with each other in providing weapons to foreign countries (horizontal proliferation) while steadily improving the quality of their own weapons (vertical proliferation). They have proliferated missiles not only to their

respective allies but also to the third world countries by means of military aid or the sale of arms. Their basic intention in so doing is to exercise influence over their allies, to influence the outcome of regional conflicts in a way beneficial to themselves through their support of the governments of friendly nations and to gain access to (military) installations and bases or to exert pressure on the rulers of importing countries.²

The United States found out later that, like nuclear proliferation, the proliferation of missiles and missile technology to the third world brought more disadvantages than advantages to itself and that it would in the end jeopardize its interests in protecting its technologies and its security. Therefore the United States began to tighten its control over the export of missiles from the latter half of the 1970s. The Soviet Union, too, has not exported the new-generation ballistic missiles to the third world since the 1980s. However, as the missiles and missile technology possessed by the third world have come mainly from these two super-Powers, the military industries and armament development programmes of many countries are still heavily dependent on the United States and the Soviet Union in terms of funds, technology, trained personnel and other matters. Consequently, the acts of direct and indirect, active and passive proliferation of missiles and missile technology on the part of these two countries have never stopped. The self-contradictory "dual policy" pursued by them on the question of non-proliferation—opposing proliferation unfavourable to themselves but encouraging or acquiescing in proliferation favourable to themselves—has proved that the traces of competition between the two super-Powers can still be found in the matter of missile proliferation in the world today.

The proliferation of missiles is also the result of the constant intensification of the regional arms race. The

occurrence and development of regional conflicts have provided the super-Powers and other outside forces with opportunities for meddling and for regional hegemonism and expansionism. In the meantime, it is precisely due to the interference by the big Powers and to the rampancy of regional hegemonism that regional contradictions have become more acute and complex and that regional conflicts have become more intense and protracted, thus steadily intensifying the regional arms race. The protracted arms race among the countries concerned, whether in the Middle East or in South and North-East Asia, has led to the race in production of ballistic missiles. With the support and assistance given by the United States and other Western countries, Israel has developed rapidly its military strength and military science and technology, thus impelling such countries as Egypt and the Syrian Arab Republic to try their best to increase their defence capability and to strive to seek sources of weapons. This has provided the Soviet Union with a huge market for arms. The development of ballistic missiles by Israel, which began in the first half of the 1960s, has incited Egypt to develop missiles by itself. With Israel's deployment of Jericho I missiles and its purchase of Lance missiles from the United States, more Arab countries have imported large numbers of Frog and Scud missiles from the Soviet Union. The race in ballistic missiles between Iraq and Iran and between India and Pakistan has been caused by the constant escalation of the arms race.

The pursuit of high profits by the munitions corporations of the developed countries is another important cause of the proliferation of missiles throughout the world. Despite the great efforts made by the international community to stop the proliferation of missiles over the years, most of the technology and spare parts and components of the various types of missiles that have been developed

successfully or that are under development in some third world countries have now been provided by the munitions enterprises of developed countries such as the United States and Western European countries.

To restrict the proliferation of missile technology, seven Western countries, headed by the United States, after four years of secret negotiations, signed the document concerning the Missile Technology Control Régime (MTCR), in Rome in April 1987, in an attempt to exercise strict control over the export of missile technology. However, it is the munitions firms of these countries themselves that have sold missile technology and spare parts and components of missiles to some third world countries directly or indirectly and openly or secretly for the purpose of seeking high profits. According to the American Broadcasting Company, Iraq has the capability to produce medium-range missiles and almost all its technology and equipment have come from the corporations of the Western countries, including the United States. Another typical example was the involvement of firms from many Western countries in the Argentine Condor I and Conder II programmes. Such instances involving Western corporations are, in fact, numerous. As pointed out by the *Financial Times* of London, the MTCR has not won clear support from the higher levels of the Governments of most of the signatories, and instances of violations of its restrictive provisions by the firms, particularly those of European countries, can be found everywhere. Apparently, the proliferation of missiles in the world would not have developed to the point where it is today without the direct or indirect technological assistance offered by the munitions enterprises of the developed countries.

Impact and Latent Danger

Ballistic missiles have so far been used five times in regional conflicts. Apart from the launching of a few Scud B missiles by Iraq in the recent Gulf war, they were used four times earlier. In the fourth Middle East war, in October 1973, the Syrian Arab Republic launched approximately 20 Frog-3 and Frog-7 missiles to attack some military bases in the northern part of Israel, with no great damage resulting therefrom. In the early period of the Iran-Iraq war, Iraq launched a few short-range missiles against border towns of the Islamic Republic of Iran and then launched more than 100 Scud B missiles against Iran's targets deep inside its territory between 1983 and 1986; Iran launched a counter-attack on Iraq after acquiring the same type of missiles from the Libyan Arab Jamahiriya in 1985; both sides waged a large-scale "War of the Cities" against each other in the spring of 1988, resulting in the loss of the lives of thousands of civilians. On 15 April 1986, the Libyan Arab Jamahiriya launched two Scud B missiles against a United States coast guard station in the coastal area of Italy in retaliation for the United States air attack, but they missed the target. Another instance is that of the missile attack on the guerrilla positions by the Afghan Government troops at the end of 1988, with a total of over 50 Scud B missiles fired.

The use of ballistic missiles in regional conflict has to a certain extent increased the intensity and complexity of war. The impact of the proliferation of missiles on regional security should be neither underestimated nor exaggerated. The above-mentioned facts have proved that the destruction and casualties caused by ballistic missiles with conventional warheads, which are used to attack military targets, industrial facilities and residential areas, are limited, and they can exercise no decisive influence over the process of war. One of the reasons why the third world

countries wish to possess ballistic missiles is their desire to exert some sort of military deterrence on the opposing countries in their own region. However, these missiles account for only a very small part of the military strength of the countries concerned because of their limited economic strength and it is difficult for these missiles to constitute the main deterrent force against other countries. Although all of Israel's neighbours except Jordan and Lebanon have possessed ballistic missiles, the military circles of Israel hold that "the demon has not yet come out of the bottle" and so the threat posed to Israel by the proliferation of missiles is "potential" rather than "actual".³ For some of the third world countries, such as Brazil and Argentina, the purpose of developing and possessing ballistic missiles is not just for mutual deterrence but for the establishment of their own political status as a regional power by developing technology and enhancing defence capability.

However, the increase in the number of third world countries possessing ballistic missiles and the growth in the number of missiles obviously involve the following latent dangers as far as regional stability and world security are concerned.

Escalation of the Regional Arms Race and Regional Instability

As the proliferation of missiles takes place mainly in those "hot spot" areas where turbulence and confrontation have long existed and where military conflicts occur occasionally, the increase in the number of missiles deployed or the possession by one country of a certain new type of missile tends to make its hostile neighbour or neighbours increase the number of their missiles in the same way or acquire a similar new type of missile. The opposing sides in the Middle East have been stepping up their develop-

ment of new-generation missiles. For instance, Israel has been developing the Jericho II; Egypt, the Badr 2000 (Egyptian designation for the Condor II); and Iraq, the Al-Hussein and the Al-Abbas. Israel signed an agreement with the United States on the joint development of the Arrow ATBM at the end of June 1986, according to which the United States is to share 80 per cent of the cost and Israel 20 per cent.⁴ In addition, the United States decided at the end of last year to sell the Patriot ATBM systems to Israel (it was planned to enable Israel to deploy them by the end of this year).⁵ As a result of the outbreak of the war in the Persian Gulf, the United States has taken the measure of emergency delivery and thus Israel has acquired the ATBM capability ahead of schedule. Undoubtedly, this will enhance the determination of other countries in the region to try to improve the penetration capability of their ballistic missiles in the future. In South Asia, India's successful test-launching of its Agni medium-range missile, with a maximum range of 2,500 kilometres on 22 May 1989, has naturally caused anxiety among its neighbours. All these facts have shown that the unlimited proliferation of missiles can only bring about a spiralling escalation of the regional arms race, further intensify the tension in the regions concerned, and even cause the outbreak of an even newer and bigger regional conflict.

Proliferation of Chemical and Nuclear Weapons and World Security

As chemical weapons can be produced in a far simpler way than nuclear weapons, and as it is relatively easy to acquire most of the raw materials needed for producing them on the international market, some third world countries are reluctant to abandon their right to produce chemical weapons, in an apparent attempt to use this kind of "atom bomb of the poor" to deter their neighbouring

opponents. As an ideal means of delivery of chemical weapons, ballistic missiles are what those countries that intend to possess chemical weapons seek to acquire.

Likewise, ballistic missiles are also the best means of delivery of nuclear weapons, and the countries which are developing their new-generation medium-range missiles are precisely those to be considered as "nuclear-threshold countries", that is, countries which have the potential of producing nuclear weapons. The successful development of medium-range missiles may possibly incite to some extent the desire of these countries to possess more chemical and nuclear weapons. Therefore, the proliferation of ballistic missiles has increasingly been considered in recent years to be interwoven with the proliferation of chemical and nuclear weapons. Once chemical and nuclear weapons are really possessed by some countries in "hot spot" regions and are used in regional conflicts, this will inevitably not only bring about disastrous consequences to other countries in the same region but also engender an extremely great danger to world security and peace.

Intervention by the Super-Powers and Regional Contention

The proliferation of ballistic missiles to the third world and the "hot spot" regions in particular has not only aggravated the contradictions and struggles among the countries concerned there but has also provided a pretext for new intervention by the super-Powers. The United States holds that the possession and updating of ballistic missiles by the third world countries have increased the threat to the security of its regional allies and, furthermore, have constituted a threat to the security of its forces and bases overseas.

Accordingly, former United States President Ronald Reagan called for struggling resolutely against this "dan-

gerous trend" in National Security Decision Directive No. 70, which he signed in November 1982. The tough stand and firm action taken by the United States against Iraq in the recent Gulf crisis were caused by the unanimous opposition on the part of countries all over the world to Iraq's policy of aggression and expansion. But in the meantime they have fully shown that the United States has, for its own strategic interests, taken advantage of this opportunity to get rid of this "malignant tumour", which had long been regarded as a threat to its security. Although unable to contend with the United States in the handling of the Gulf crisis as a result of being busy with resolving difficulties that had arisen in the domestic political situation, the Soviet Union did its utmost to play its role as a super-Power and constantly created difficulties for the United States in seeking ways to bring about a political settlement. It did so also in the post-war security arrangements to prevent United States monopoly of power in the Middle East after the war.

Ways of Preventing Missile Proliferation

For a long time the international community has made great efforts to control the proliferation of missiles, but only minimal results have been achieved so far. The MTCR divides into two categories the items the export of which is restricted. The first category covers the "most sensitive" items, including complete sets of rocket systems with a payload of over 500 kilogrammes and a range of over 300 kilometres as well as subsystems and their production equipment, stages of individual rockets, re-entry vehicles, solid or liquid fuel for rocket engines, rocket guidance systems and launching devices and so on. The second category refers to the production technology which may be useful to the large-scale production of missiles but presents little risk in the near future, including 15 items such as

production facilities for propellants, structural materials, aviation electronics, ground support equipment, testing equipment and computer software. The agreement stipulates that the items listed in the first category are to be under severe restriction and are generally not permitted to be exported and those in the second category are permitted to be transferred, except in special circumstances, so long as there are guarantees between Governments. This agreement is the first written document in the world concerning control over the proliferation of missiles. None the less, even the Western countries themselves have admitted that the provision of the MTCR on restricting transfer are "far from enough" and are made "too late" because the missiles and missile technology possessed by many third world countries have already surpassed the performance level restricted by the MTCR.

The reason why it is difficult for this régime established for the purpose of restricting the proliferation of missiles to yield results is that it contains many serious defects and loopholes. It is a régime intended to enable big countries to restrict small ones and to enable developed countries to restrict developing ones. It is not an international convention with broad representation concluded through consultation on the basis of equality by all countries of the world. Besides the seven founding nations, only eight other nations have acceded to the agreement. Many nations possessing missiles, including the Soviet Union, have not yet joined the MTCR. It is not an international legal instrument, neither a treaty nor an official agreement, neither with an international executive body nor with any verification provision or provision on sanctions against violations, so it has little binding force on the signatories. It is precisely for this reason that many munitions corporations of the signatories have apparently violated the agreement. Moreover, as most parts of the technology of the

medium-range missile and especially of the inertia-guidance technology are roughly the same as those of satellite-carrying rockets for civilian use, which can hardly be distinguished from military ones, this régime discriminates against the right of third world countries to develop space technology and to utilize outer space for peaceful purposes. In addition, the criteria relating to the restricting of the export of missiles as set forth in the MTCR legalize, in effect, the sale in large quantities of such short-range missiles as Lances and Scuds by the developed countries. This clearly contradicts the efforts made by the international community to halt the proliferation of missiles.

The occurrence of the Gulf crisis has made the international community demand more urgently than before the halting of the proliferation of missiles and of nuclear, biological and chemical weapons. Not long after the end of the war in the Persian Gulf, the United Nations Security Council adopted resolution 687 (1991), which provides that Iraq shall destroy completely, under international supervision, all its weapons of mass destruction and their production facilities, including all ballistic missiles with a range in excess of 150 kilometres and their production facilities. This is undoubtedly an effective measure for preventing Iraq from developing and deploying ballistic missiles again. However, the scope of proliferating missiles in the present-day world is not limited to Iraq alone. Effective prevention of world-wide proliferation of missiles will be a very arduous, long-term task facing the entire international community. Member nations of the MTCR held a meeting in Tokyo late in March and have planned to hold another meeting in Washington in November this year to study specific measures for tightening control over missile technology.

Although the strengthening of the restrictive measures of the MTCR may perhaps play a positive role in

preventing or slowing down the proliferation of missiles, people will still be sceptical about whether any new measure will produce the desired result because of defects in the régime itself. To halt the proliferation of missiles completely, attention should be paid to the following points:

1 Whether the proliferation of ballistic missiles can be halted will depend on the settlement of regional conflicts because these are the most direct stimulant to the proliferation of missiles to the third world. As long as regional conflicts are not eliminated, the regional arms race will not stop. Therefore, overall, just and rational settlement of regional disputes and conflicts is the only fundamental way of preventing the proliferation of missiles. The international community should work unremittingly to this end.

2 The world process of arms control and disarmament is closely related to the halting and slowdown of the proliferation of missiles. The growth and decline of the armaments of the super-Powers and the progress in their disarmament talks not only bring about a change in the United States-Soviet Union bilateral relations but also have an important impact on the changes in the world and regional security situation. The intensification of the arms race between the United States and the Soviet Union will inevitably stimulate the increase in the armaments of the regional countries while the progress in the United States-Soviet Union disarmament talks will promote the process of regional arms control. Therefore, to halt the proliferation of ballistic missiles, the super-Powers must assume the special responsibility of taking the lead in making a significant reduction of their nuclear and conventional weapons to improve the security environment of all regions in the world and to impel regional countries to give up the option of developing and possessing nuclear and conventional missiles and biological and chemical weapons.

3 To encourage the third world countries to halt the proliferation of missiles of their own accord, the United States, the Soviet Union and other developed countries must discard completely their "dual policy" on the question of non-proliferation. Both "horizontal proliferation" and "vertical proliferation" should be stopped. On the question of "horizontal proliferation", the super-Powers must take the lead in halting the proliferation of missiles and missile technology to their respective allies and friends. All developed countries must exercise strict control over the sale of weapons to foreign countries by their munitions enterprises and must prevent the proliferation of missiles and missile technology in all forms.

4 The exploration and development of effective measures to control the transfer of weapons must be conducted jointly by countries all over the world on the basis of equality so as to avoid the imposition on other countries of an agreement reached by a few countries as a *fait accompli* for their acceptance. The United Nations should play a full and positive role in organizing and formulating laws and regulations concerning control over the world-wide and region-wide transfer of weapons and in carrying out the needed supervision and verification.

The proliferation of ballistic missiles has become an important problem of universal concern in the international community. As no really effective solution has been found to this date, judging from the current trend of development, people can by no means be optimistic about the prospects of halting the proliferation in the near future. Since the causes of the proliferation of missiles are complex, it is surely difficult for any simple restrictive measure to lead to success. Only when practical measures are adopted simultaneously in all aspects can the proliferation of ballistic missiles be checked fundamentally. The inter-

national community must make long-term and arduous concerted efforts to this end.

Notes

- 1 International Institute for Strategic Studies, *Military Balance, 1983-1984* (London, IISS).
- 2 *The Atlanta Constitution*, 12 July 1988, p. 15.
- 3 *The Christian Science Monitor* (International Edition), 25 July 1988, p. 7.
- 4 *The Washington Post*, 29 June 1988, p. 1.
- 5 *The Los Angeles Times*, 9 March 1990.

Accidental Nuclear War

The Swedish Initiative on Accidental Nuclear War

Sven Hellman

The Initiative

Vastly improved East-West relations in the last few years have created better prospects for efforts with a view to common security and arms control agreements than ever before in the era following the Second World War. However, the danger of backlashes cannot be ignored.

An intentional war between the major nuclear-weapon States seems unlikely today. Nevertheless, technological developments, dangerous military doctrines, proliferation of nuclear weapons to additional countries, and regional conflicts in strategically important areas combine to create the risk of an accidental nuclear war. An initiative to avert such a threat now seems both urgent and promising.

The aim of the Swedish Initiative is not to make nuclear weapons more acceptable, but to improve the possibilities for the survival of mankind pending the complete elimination of nuclear weapons.

Representatives of all six political parties in the Swedish Parliament and nine Swedish professional organizations against nuclear arms have founded the "Swedish

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Initiative for the Prevention of Accidental Nuclear War" with a view to promoting measures to reduce the danger that a nuclear war might break out accidentally.

Sweden has no nuclear weapons and does not belong to any military alliance. Still there are good reasons why Sweden should take the initiative in this matter. Its geostrategic situation is strongly influenced by the deployment of nuclear weapons in nearby areas. Sweden has traditionally been ready to act as a mediator or to take initiatives in the area of multilateral arms control negotiations, as evidenced, for instance, at the Stockholm Conference in Security and Co-operation in Europe (CSCE). Its policy of non-participation in alliances has given Sweden opportunities to act internationally, in ways that are not always open to other States. After a period of keeping a nuclear-weapon option, Sweden decided, in 1968, to renounce this option and, following this decision, to accede to the Treaty on the Non-Proliferation of Nuclear Weapons.

The basic aim of the Swedish Initiative is to put the prevention of accidental nuclear war on the political agenda and to get things done in order to reduce the risks. For this purpose, an international conference was organized in Stockholm, from 14 to 16 November 1990, to design and present an "Action Programme" for reducing the risks of accidental nuclear war. Some thirty internationally renowned experts were invited to contribute to the Conference as consultants. They provided expert advice and a variety of proposals to the Swedish group, who finally formulated the programme. The Action Programme¹ is addressed to the Swedish Parliament and Government as well as to other Governments, particularly those of the nuclear-weapon States. The Action Programme proposes initiatives to be undertaken by the United Nations and in other international bodies.

The Conference was organized under the auspices of the Speaker of the Swedish Parliament and the Royal Swedish Academy of Sciences. Financial grants were received from the Swedish Ministry for Foreign Affairs.

As a starting-point, the Conference discussed the evaluation of risks and considered the scientific aspects of the problem: possible sources of an accidental nuclear war, safety problems inherent in existing force structures and command-and-control systems. It also discussed a number of formulas for the prevention of accidental nuclear war.² The main effort of the Conference was directed towards designing a combination of mutually reinforcing protective measures, which are effective in reducing risks, politically feasible and sufficiently verifiable. The Conference also discussed possible political procedures for having these measures implemented. A basic idea was to transform the accumulated scientific knowledge into a promising political initiative.

Earlier Efforts to Prevent Nuclear War

Since the early days of nuclear weapons the established nuclear-weapon States have had a common interest in avoiding any unauthorized or accidental use of nuclear weapons. Many safeguards have been introduced, either unilaterally or by bilateral (or in some cases multilateral) agreement.

The nuclear warheads themselves have been designed to preclude the possibility of accidental detonation as a result of exposure to mechanical damage, heat, blast or radiation. However, the degree to which that is true in countries other than the United States is largely undocumented. For the United States, detailed information has been made available, and some of it is very disquieting. Not all existing nuclear weapons satisfy the fundamental re-

quirement that a full nuclear yield should be impossible in an aircraft crash or fire.

Technical designs and standard operating rules have been developed to preserve effective control over globally dispersed procedures that are routine in peacetime. These efforts have been successful in the sense that no accidental or unauthorized nuclear weapon explosion has occurred so far.

The control, at least the first use, of any nuclear weapon has been highly centralized in all countries concerned. Complex procedures have been developed to secure continuous contact and authentic messages. Nuclear-weapon States have instituted special controls for weapons deployed outside their own territory. Weapons equipped with the permissive action links (PALs) system cannot be used unless they have received a highly secured coded signal from the highest political level.

The military take special precautions to screen those individuals who have access to nuclear weapons.

In 1963 the "hot line" between Moscow and Washington was established, after the Cuban missile crisis, in order to reduce the risk of nuclear war by accident, miscalculation or failure of communication. It has been improved and updated with new technologies a number of times.

Several additional agreements between the Soviet Union and the United States have been concluded to reduce the risk of inadvertent military confrontation and nuclear war. These agreements include commitments to notify the other party immediately about any accidental missile launch and to destroy the missile, advance notification of missile launches, and the creation of Nuclear Risk Reduction Centers in Moscow and Washington.

The positive effects of these measures have to some extent been counteracted by developments in nuclear weapons systems and military strategy. As the risk of inten-

tional super-Power war has diminished, the risk of accidental nuclear war is considered to be unacceptably high today and further protective measures are needed. The essential measures must be based on an evaluation of the command and control system.

Increasing Risks

There are some developments which are viewed as likely to increase the risk of accidental nuclear war:

- Internal turmoil in nuclear-weapon States
- Conflicts emphasizing the perceived need for weapons of last resort, such as chemical or nuclear weapons
- Clandestine nuclear proliferation in some countries, mainly in crisis-exposed regions
- The possibility of nuclear terrorism
- The development of high-precision, short-time-of-flight or stealth weapons that make rapid response necessary
- The development of anti-satellite and other space weapons further emphasizing the need to pre-plan short-time responses.

There have been fundamental changes in Europe in the course of the last few years. Improved relations between the United States and the Soviet Union, the democratization and liberation process in Eastern Europe, the unification of Germany, the development of the Common Market and, finally, the search within the CSCE for a new security structure for Europe are all very positive elements. On the other hand, old and earlier suppressed conflicts in Europe are emerging once again and may create problems in the future.

A new aspect has been added by the unrest, on occasion armed and violent, within the Soviet Union, which possesses thousands of widely deployed nuclear weapons. Concern has been expressed about the possibility of nu-

clear warheads being stolen and used to achieve local political or private goals, or even sold to another country. However, according to reports from the Soviet Union, nuclear weapons have been removed from conflict areas.

The recent war in the Persian Gulf exemplifies a new type of confrontation, in which the development of ballistic missiles has been particularly significant and the use of nuclear or chemical weapons seemed a possibility.

Developments within countries assumed to be engaged in covertly acquiring nuclear weapons are apparently going on without much restraint. Several of the countries in question now have ballistic missiles. As some of these countries lack the political stability and technological capacity to control nuclear weaponry effectively, the risk of leakages to terrorist groups or of unauthorized use during political turmoil will also increase. Such use may be misinterpreted by some established nuclear-weapon States and lead to further escalation.

Current and potential conflicts within and between developing countries and the acquisition of modern weapons by these countries underline the need to prevent accidental war.

Another factor to be taken into account is technological development within the established nuclear Powers. There is increasing sophistication in terms of improved accuracy, stealth technique and reduced flight times. These developments, combined with changes in strategic doctrine, greatly increase the difficulty of further developing an integrated command-and-control system to ensure firm political control of nuclear weapons. Shorter decision times exacerbate the consequences of computer failure, program errors and human dysfunction. The vulnerability of command-and-control systems creates dangerous incentives to use force quickly, even pre-emptively, before the systems collapse.

The development of anti-satellite and space weapons further emphasizes the need to plan short-time responses. Hence these weapons are highly destabilizing.

The widespread presence of non-strategic naval nuclear weapons is a matter of grave concern, since their early use in a conflict could be encouraged by the theoretical possibility that they could be used in a military encounter at sea without causing direct damage to civilian life or property. To make matters worse, these weapons are not protected by PALs adequate to preclude their use without authorization by the central political authority.

In view of the increasing risks referred to above, measures designed to prevent accidental nuclear war have become very urgent.

The Structure of the Action Programme

The action programme covers a number of ways in which the risks of accidental nuclear war could be reduced:

- Reduction of mutual mistrust, misunderstanding and fear, and the building of confidence through increased openness about nuclear forces and restraints on their operation

- Improvement of crisis stability through sufficient survivability of weapons and command-and-control systems and through reduced reliance on short-time reactions

- Improvement of political control of weapons

- Prevention of the proliferation of nuclear weapons

- Abolition of destabilizing systems

- Improvement of crisis management capability.

Special emphasis should be put on the interrelationship between the further technological development of the arsenals of established nuclear Powers (vertical proliferation) and the spread of nuclear weapons to further countries (horizontal proliferation). A comprehensive nuclear-test ban, combined with major reductions of the nuclear

arsenals, could reduce the prestige of owning nuclear weapons and thus contribute to non-proliferation.

Verification of compliance with agreed arms control measures is quite essential. This problem will be easier to solve with the new openness shown in recent arms control agreements, such as the Treaty between the United States and the Soviet Union on the Elimination of Their Intermediate-Range and Shorter-Range Missiles (the INF Treaty) and the Treaty on Conventional Armed Forces in Europe.

The action programme for the prevention of accidental nuclear war consists of a number of measures, which are assigned to four different though interrelated packages. Attempts to get the specified measures accepted politically and implemented should be carried out simultaneously in each of the four packages, and as soon as possible.

Within the first two packages the measures are selected as far as possible with a view to their being:

- Individually effective in reducing risks
- Mutually reinforcing
- Politically feasible
- Sufficiently verifiable to prevent violations.

The first package is a programme for reducing risks connected with existing nuclear arsenals. It is made up of steps that can be taken at an early date. The unilateral steps and bilateral confidence-building measures proposed here are intended to make a substantial contribution to reducing the risk of accidental war. The limited nature of the proposals should make them relatively easy to negotiate, agree upon and implement. The proposals will not require major changes in existing nuclear arsenals or in the concept of nuclear deterrence.

This package contains 15 proposals, most of them already described in previous articles. I shall mention only a few.

—The legislatures of all nuclear-weapon States should demand and receive authoritative reports from a commission of military and independent experts, reviewing in detail the adequacy of existing safeguards of all nuclear weapons in their arsenals.

—All nuclear-weapon States should be party to agreements calling for immediate notification of accidental launches or other unexplained incidents that could create the risk of a nuclear war. Given the short time involved in warning, missile flight and decision-making, it is important to decide in advance how to deal with any given situation.

—In order to increase political control of nuclear weapons, at least the United States has installed PALs, or their functional equivalents, on army and air-force nuclear weapons. These devices would make it impossible for anyone to detonate the warhead without a specific electronic or mechanical input from the highest political authority. PALs should be installed on all nuclear weapons; no exception should be made for naval nuclear weapons.

—Outbreaks of regional conflict in the third world, involving regional Powers equipped with large arsenals of conventional arms plus chemical and possibly nuclear munitions, are a major emerging threat to world security in the 1990s and beyond. Confidence-building measures are needed to reduce mutual apprehension regarding the military intentions and capabilities of competing regional Powers, and to reduce the risk that relatively minor incidents will ignite a major armed confrontation.

The second package should be seen in connection with major nuclear arms reductions (START II and others). The measures are intended to ensure that during the arms reduction process the risk of accidental war is further reduced and kept to a minimum.

In this package there are nine proposals, of which I shall mention a few. The most imperative step seems to be

to abolish the most destabilizing strategies, systems and forces.

—Any strategy of launch-on-warning should be renounced and retaliation should be delayed until the source and size of the attack have been evaluated. Consequently, vulnerable and destabilizing nuclear weapons such as fixed-site, land-based, ballistic missiles and more accurate short-flight-time systems should be the first to be abolished. For the same reason, the command-and-control systems should be designed to function in a nuclear environment (protection against electro-magnetic pulse (EMP), ground mobile or airborne command centres and communication nodes). There should be an agreement not to deploy anti-satellite weapons.

—In order to reduce the prestige of nuclear weapons and to convince the threshold States of their uselessness, the established nuclear-weapon States should make significant cut-backs in their arsenals, and stop all testing of nuclear warheads. This would be seen as a very positive and necessary response to the criticism expressed at the 1990 Review Conferences of the Treaty on the Non-Proliferation of Nuclear Weapons. Otherwise it might be difficult to renew the Treaty in 1995.

The third package is a programme dealing with a new negotiating forum and a new legal framework (a treaty) for handling the prevention of accidental nuclear war. As a nuclear exchange would affect people everywhere, a new body with broad global representation needs to be set up on the basis of the principle of common security:

—At least initially, we consider it necessary to have negotiations concerning the prevention of accidental war separate from ongoing structural arms control negotiations so that the negotiations on the prevention of accidental war may not be delayed by them. The Conference on Disarmament in Geneva should set up a new sub-commit-

tee with a view to achieving, as a matter of high priority, agreement on a programme for the prevention of accidental nuclear war. This Action Programme could be used as a model.

—A new treaty on the prevention of accidental nuclear war might be negotiated by the new sub-committee. That body could, for example, agree on confidence-building measures similar or parallel to those adopted by the Conference on Security and Co-operation in Europe.

The fourth package consists of a programme intended to create and sustain public awareness and concern about the problem of accidental nuclear war. This will provide the basis for public pressure on civil and military decision-makers and advisers within Governments to do everything possible to reduce the risk of accidental war.

—An information campaign on the dangers of accidental nuclear war is essential. It could be seen as a supplement to the United Nations comprehensive study on nuclear weapons, and to efforts by the International Physicians for the Prevention of Nuclear War to make people aware of the disastrous consequences of a nuclear war.

—Education on these matters should be an integral part of university-level curricula, and such initiatives as the projects by the Talloires group and the International Association of University Presidents should be supported.

Launching the Programme

A basic question for the Swedish group is how the Action Programme for the Prevention of Accidental Nuclear War should be launched and supported in order to influence decision-makers in the nuclear-weapon countries.

As a first step, Swedish parliamentarians have submitted a proposal in the Swedish Parliament asking the Government to use the Action Programme for the Preven-

tion of Accidental Nuclear War to develop initiatives in the United Nations for discussion in the Disarmament Commission and the General Assembly, and in other forums as well.³

The General Assembly has several times noted with regret that, despite the fact that the Conference on Disarmament has discussed the question of prevention of nuclear war for several years, it has so far been unable to establish a subsidiary body to consider appropriate and practical measures for preventing it. As stated above, one goal is that the Conference on Disarmament in Geneva should, as a matter of high priority, establish a sub-committee to undertake multilateral negotiations to achieve agreement on a programme for the prevention of accidental nuclear war. Some further initiatives by the United Nations General Assembly seem to be necessary.

The above-mentioned initiatives could, if considered necessary, be supported by a resolution of the General Assembly requesting the Secretary-General to appoint a group of experts to prepare a comprehensive report on the risks of accidental nuclear war.

At the same time, the Action Programme should also be brought to the attention of nuclear-weapon States engaged in bilateral negotiations, for example in connection with START II and the forthcoming negotiations on short-range nuclear weapons in Europe.

Parliamentarians for Global Action could be encouraged to bring the dangers of accidental nuclear war to the attention of parliamentarians throughout the world.

Lawyers and their associations need to be encouraged to work on the further development of an international legal régime relating to the prevention of accidental nuclear war. We hope that the International Association of Lawyers against Nuclear Arms, in particular, will act on the Swedish Initiative and that the programme will be

further discussed at forthcoming scientific and other non-governmental congresses. Current research has for the most part been devoted to risks related to East-West relations. More emphasis should in future be put on the prevention of nuclear war in other regional contexts. It is gratifying to note that an international conference on this theme is to be organized in Tallinn, Estonia, in October or November 1991 under the auspices of the Estonian Academy of Sciences.

Experts, guests and youth participants at the 1990 Stockholm conference have undertaken to submit articles to influential journals and other media in their home countries, advocating measures to prevent accidental nuclear war.

It is hoped that the Action Programme will be made available as widely as possible to citizen groups and popular social movements concerned about world peace, and that young people will be invited to participate in future initiatives of this kind alongside the "experts", to work towards increasing the safety of nuclear weapons.

Notes

- 1 "Action Programme for the Prevention of Accidental Nuclear War". Adopted by the Board of the Swedish Initiative for the Prevention of Accidental Nuclear War after the international conference in Stockholm, Sweden, 14-16 November 1990. 25 pages. Copies may be ordered from Carin Atterling-Wedar, St. Paulsgatan 37, S-116 48 Stockholm, Sweden. Fax + 46 8 7021 780.
- 2 Some recent publications are: Sven Hellman, "The Risks of Accidental Nuclear War", *Bulletin of Peace Proposals*, vol. 21, No. 1 (March 1990), pp. 99-103; Frank von Hippel and others, "How to Avoid Accidental Nuclear War", *The Bulletin of the Atomic Scientists*, June 1990, pp. 35-37; Bruce G. Blair and Henry W. Kendall, "Accidental Nuclear War", *Scientific American*, December 1990, pp. 19-24.
- 3 Swedish Parliament Motion 1990/91:U428 by Karin Söder and others concerning the prevention of accidental nuclear war.

Preventing Accidental Nuclear War: Risks and Remedies in a Post-Cold-War World

Michael D. Wallace

Introduction

For over forty years the world has been haunted by the spectre of a global nuclear war arising from a deliberate or even an inadvertent escalation of the strategic confrontation between the United States and the Soviet Union. Most dramatically in 1962, but also in 1968 and 1973, nuclear weapons systems were readied for war in response to a super-Power crisis. From 1982 to 1987, both sides deployed nuclear forces in such a manner that they could destroy each other's headquarters and command systems in less than eight minutes. At any moment during these periods of nuclear brinkmanship a failure in crisis management on either side might have resulted in the destruction of planetary civilization.

Since 1987 the dramatic improvement in United States-Soviet relations has markedly reduced the risk of both deliberate and inadvertent escalation, and the leaders of the two nations have declared their intention to eliminate this danger altogether. Nevertheless, even if nuclear war as a conscious instrument of Soviet or American policy

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is no longer conceivable, there are a number of good reasons for believing that a super-Power nuclear war could still begin by accident. The increasing size of nuclear weapons arsenals possessed by France, the United Kingdom, China and a growing number of other nations has extended the risk of both deliberate and inadvertent nuclear war to many regional conflicts, while at the same time it has complicated the task of preventing an accidental war between the super-Powers.

An accidental nuclear war even at the regional level would dwarf the apocalyptic impact of the recent Gulf war on the civilian populations in the affected areas. In the case of the super-Powers, an accidental nuclear-weapon launch involving even a single local command could result in as many as 300 to 500 nuclear explosions each 10 to 30 times as powerful as the bomb that destroyed Hiroshima, representing a catastrophe unparalleled in human history. In today's radically altered international climate, there is no longer any need to tolerate such a horrifying possibility. A few relatively simple and inexpensive steps, taken unilaterally or by multilateral agreement among nuclear-weapon States, could sharply reduce the risk of accidental nuclear war without any serious impact on their national security or the military balance.

The Post-1987 Risk of Accidental Nuclear War

The intense United States-Soviet arms race and strategic confrontation of the early 1980s alarmed many strategic analysts who felt that certain provocative modifications to the nuclear deployments and doctrines on both sides immediately before and during that period had created a significant risk that a major political crisis could trigger a nuclear war by accident or inadvertence. Improving super-Power relations in recent years have gone a

considerable distance to reducing at least two of these concerns.

At the level of strategic command, control, communications and intelligence (C³I), a growing consensus had developed during the 1980s that the deployment of "fast attack" strategic nuclear systems within range of key command centres would reduce to almost zero the time available to decision-makers to distinguish between a real attack and a false alarm.¹ Capable of destroying hardened sites and disrupting communications with a nuclear-generated "electromagnetic pulse" in less than eight minutes after launch,² these deployments virtually forced strategic planners on both sides to adopt a *de facto* policy of "launch on warning" in the event of a serious crisis.³ Analysts estimated that under some conditions, the chance that a false alarm could provoke a nuclear launch could be as high as 50 per cent.⁴

The 1987 Treaty between the United States and the Soviet Union on the Elimination of Their Intermediate-Range and Shorter-Range Missiles (INF Treaty) represented a major step towards the elimination of this strategic nuclear hair-trigger. It committed the two Powers to the complete destruction of the most provocative fast-attack systems, particularly the American Pershing II ballistic missile and all ground-launched cruise missiles (GLCMs) on the United States side, and the SS-20 (RSD-10) on the Soviet side. Informally, the Soviets responded to the signing of the INF Treaty by redeploying their ballistic missile submarines out of range of United States command centres, a development that was greeted, in the words of one senior United States Air Force officer, with "immense relief".

The end of the confrontation between members of the North Atlantic Treaty Organization (NATO) and members of the Warsaw Treaty Organization (WTO) in

central Europe sharply reduced the risk of nuclear accident as the result of tactical nuclear systems as well. From 1967 until 1990, the military operating doctrine of NATO provided for the early release of tactical nuclear weapons to theatre commanders in the event of a conventional attack by WTO. Most analysts noted that the conflicting requirements of allied consultation, dispersal and concealment, physical security, and command structure integration meant that the actual process of tactical release in the event of a European war would be chaotic at best, and at worst would create a considerable risk of the accidental or unauthorized use of nuclear weapons systems.⁵ Faced with this threat, Soviet military commanders moved to integrate their nuclear systems more closely with their forces in Europe, especially after East-West tensions began to increase in the early 1980s.⁶ Many feared that these developments could lead to an uncontrollable spiral of nuclear escalation in the event of an armed conflict in Europe, especially given the inevitable compromises with safety and security involved in designing and deploying small, mobile nuclear systems. Fortunately, these frightening hypotheses were never put to the test as improving super-Power relations, the withdrawal of most Soviet forces from Eastern Europe, and the recently signed Treaty on Conventional Armed Forces in Europe have virtually eliminated the risk of a United States-Soviet nuclear confrontation in Europe.

But the positive impact of improving super-Power relations has not resulted in the total elimination of the threat of accidental nuclear war. A number of key risk factors have been affected little or not at all by the improving climate and, paradoxically, in some ways the chance of a war by accident may actually have increased since 1987. Seven factors may be identified that contribute to the ongoing threat of accidental nuclear war:

- 1 The overall level of nuclear readiness that continues to be maintained by the nuclear forces of both the United States and the Soviet Union;
- 2 Ongoing concerns about human reliability, especially given the very large and still expanding number of nuclear-weapon States and systems;
- 3 The ever-expanding automation of nuclear systems, and in particular the introduction of so-called artificial intelligence systems as part of the management of nuclear operations;
- 4 The large number of nuclear weapons—especially tactical ones—with less sophisticated, earlier-generation safety and security features;
- 5 The special risks posed by the growing number of naval strategic nuclear platforms and weapons;
- 6 Within the category of naval systems, the particularly acute dangers posed by submarine operations and submarine-launched nuclear weapons;
- 7 The almost incalculable dangers posed by the threat of civil conflict in nuclear-weapon States.

Nuclear Readiness

To begin with, a significant risk is posed by the high level of strategic nuclear readiness maintained by both the United States and the Soviet Union. The latter maintains between 50 and 80 per cent of its intercontinental ballistic missiles (ICBMs) in launch-ready status, and 15 per cent of its ballistic-missile-firing submarines at sea. American forces are typically at an even higher level of alert, with 90 per cent of their ICBMs launch-ready, half of their missile submarines at sea, and at least a quarter of their bombers on ground alert.⁷ Of course a dominant objective of both sides is to prevent an accidental or unauthorized launch, and both have put in place scrupulous safeguards and

sophisticated technology to achieve this end. But even their long record of success is not an argument for complacency; no large and complex system can be made totally failure-proof.

In fact, several times every day the multiply redundant sensor systems that are designed to warn of an enemy attack—radar, optical and infrared—produce anomalous signals that might be indications of an attack. Although most are quickly discounted, on an average of once a year or so such a false alarm is misinterpreted or misprocessed, and ends up triggering a nuclear alert on the American side.⁸ These nuclear alerts increase still further the proportion of nuclear forces placed in a high state of readiness and, more ominously, begin the process of readying United States strategic forces for use. Bombers are scrambled, silos are readied, warning messages are sent to submarines, and the National Command Authority—the Joint Chiefs of Staff, the Secretary of Defense, and the President—are notified.

Thus far, this self-triggering of the United States nuclear alerting system has always been partial, and halted well before an actual launch. But in the midst of a crisis—even one not directly involving the USSR—the default option for an American leadership facing an apparent strategic threat might be to continue rather than discontinue the activation of its own strategic systems. Warnings of these moves received by their own sensors might well lead the Soviets to initiate their own alert, beginning a lethal feedback loop of mutual escalation and heightened tensions.

Clearly there can be no possible justification for the dangers posed by such a tightly wound system save the imminence of strategic confrontation. Given the fact that such an event is now extraordinarily unlikely and perhaps

impossible, simple prudence would suggest large bilateral reductions in the readiness levels of nuclear forces.

Human Reliability

The tight centralized control maintained over nuclear weapons in peacetime has led some to claim that human reliability does not, in and of itself, create a risk of an accidental war. Unfortunately there are several flaws in the argument. The first is that large numbers of weapons require even larger numbers of personnel to manage their operation, security and transport, and despite careful screening these individuals may not always be reliable. Every year between 2,000 and 3,000 United States armed forces personnel having access to nuclear weapons or their components are removed from duty for chronic alcohol and drug abuse, psychological problems requiring hospitalization, or felonious or insubordinate conduct involving violence.⁹ "Nuclear duty" seems to create a dangerous combination of boredom and stress, and its effects are not always possible to detect in advance. One missile-control technician in a United States ballistic-missile submarine committed a multiple homicide while on leave, and there have been several reported instances of submarine captains suffering from near total psychological collapse while in command of their nuclear arsenal. We have no comparable data for the Soviet Union, but rumours persist of poor morale, alcoholism and drug abuse. Clearly the record affords us no reason for complacency with regard to the human reliability problem.

In a crisis, the ineluctable problem of human fallibility will be magnified by the additional stress. Every level of command right up to the top political leadership will be acutely aware that their lives and those of their families hang in the balance during a strategic confrontation. Psychological studies have shown that the fatigue of a lengthy

crisis will attenuate the ability to manage complex modern military systems, producing a general disorganization of performance and, ominously, a greater willingness to take risks and ignore dangers.¹⁰

Acute information overload combines with confusing and uncertain data to create additional anxiety, which then induces still more mistakes and judgemental errors.¹¹ Perhaps most critical of all, the time pressures produced by a nuclear alert—sometimes requiring a decision involving national or even planetary survival to be made within a few minutes—act to impair information processing. People affected simultaneously by danger and time pressure focus on “quick fixes” and stereotyped reactions, are less likely to distinguish relevant from irrelevant data, will “tune out” novel information, and will cease or reduce attempts to communicate with the other side.¹²

These findings shape the lethal paradox of crises in the nuclear age: they make superhuman demands on perceptual acuity and decision-making skills, and those very demands lead to a degrading of both perception and judgement. The high incidence of human reliability problems even in peacetime strongly suggests that there are many individuals in positions of leadership or with access to nuclear weapons whose unresolved inner conflicts and/or unhappy interpersonal relationships make them particularly vulnerable. We have documented evidence of stress-induced breakdown during nuclear crises at the highest levels of command in several nations, and we may surmise that the same phenomenon has and may predictably be expected to occur down the ranks as well.¹³ Thus, despite painstaking precautions, there can be no question that an accidental nuclear war could under some circumstances result from mistakes, misjudgements, misinterpretations, oversights, faulty analysis or reasoning, failure to search for and act upon new information, and poor communication.

Automated Systems

One response to the risk of human error in nuclear operations has been their increasing automation. Especially in the United States armed forces, but increasingly among the military of other nations as well, planners now believe that "automation, robotics, and associated use of computers in artificial intelligence modes . . . will substitute for people in certain tasks; they will allow people to perform tasks better than they perform them now; and they will enable performance of tasks they cannot now perform".¹⁴

In attempting to use such systems to overcome human limitations, systems designers have created a whole new class of problems, and in so doing will probably increase rather than decrease the risk of accidental war.¹⁵ For computers to replace people in decision-making tasks they must be programmed to select and classify the buzzing welter of complex information needed to make real-life choices. Attempts to automate this human-pattern-recognition capability have proved to be one of the most fruitless tasks of software designers, and the "fog" of war and crisis exacerbates the problem. This limitation on the input side is matched by a corresponding limit on the output decision "menu". Such systems typically pre-package decision choices (fire system A/B/C/don't fire/continue tracking). As long as the situation corresponds to a pre-specified choice, all is well. But sometimes the very essence of quality decision-making is the search for novel options. In curtailing this search, automated decision-aids reinforce rather than counteract the stress-induced premature decisional closure that may result in missing an opportunity to avoid war. Moreover, the hierarchical and often counter-intuitive architecture of many decision-aids may add to stress rather than relieve it. An everyday example of the problem occurs when we attempt to use bank machines under stress

and in a hurry, losing our way in the menu and futilely striking the wrong buttons in mounting frustration. Nearly identical situations have actually occurred with automated weapons systems both in training and in combat. The destruction of an Iranian civilian airliner by the USS *Vincennes* in the Persian Gulf was the direct result of the confusion created in the minds of some officers by the complex computer-generated displays of its AEGIS automated anti-aircraft system, demonstrating in a most tragic way that automation may induce more accidents than it prevents.¹⁶

Finally, as these systems become larger and more complex it may become virtually impossible to debug the program code.¹⁷ Automated combat systems controlling both conventional and nuclear weapons are at the extreme end of the scale; the SUBACS submarine battle system, for example, has more than 4.5 million lines of code. Interactions between the various parts of such large programs are so complex that they can produce unexpected catastrophic failures, and attempting to fix them may introduce more errors.

Computer professionals never cease to warn us of the problems and limitations of automated systems, speaking of "the enormously exaggerated attributions even a well-educated audience is capable of making ... to a technology it does not understand ... there is potential for great tragedy if this credulous streak should some day combine with a mood of compulsive belligerence".¹⁸ In short, even in the eyes of their designers, automated systems are more likely to provoke than to prevent an accidental war.

The Security of Tactical and Mobile Nuclear Weapons

No matter what the balance between computer and human control, the sheer size of national nuclear establish-

ments may put them at risk. The large number of smaller, tactical weapons widely dispersed among the forces of all nuclear-weapon States raises security and safety concerns, especially with regard to their storage and transportation. Although no nuclear weapon has ever been detonated accidentally, there have been numerous cases in which weapons or their components have been damaged or destroyed by fire, explosion or air crash. Early in 1950, an American bomber carrying several thermonuclear weapons crashed in the ocean off Vancouver Island. Later that year, the chemical explosive trigger of a bomb blew up after being jettisoned over eastern Quebec. In 1956, a bomber carrying nuclear warheads crashed in Morocco, and in 1968 two more were lost in a crash in Greenland.¹⁹ Other nuclear-weapon accidents include a B-52 crash in Tennessee, two bombs dropped into the ocean off the Mediterranean coast of Spain, and still another weapon lost from the deck of a United States aircraft carrier off the coast of Viet Nam.

Given the fact that many of the United States stockpile of 24,000 nuclear warheads are transported almost daily, future accidents cannot be ruled out. Compounding the problem is the fact that many of the tactical weapons in particular are earlier, less sophisticated models, and are beginning to show the effects of age. Recently, between 300 and 400 W79 nuclear artillery shells had to be transported back to the United States from Europe when it was discovered that aging explosives combined with a design defect might have caused them to explode during handling.

The rise in international terrorism has raised additional concerns about the widely dispersed storage of nuclear weapons. A recent report of the United States Department of Energy suggested that the precautions against a terrorist attack on nuclear storage facilities outside the United States were inadequate.²⁰ Moreover, many of the

weapons at these sites were older models lacking the sophisticated internal security features of later types. Persistent reports of nuclear safety problems have now led to an ongoing Congressional investigation.²¹ Although there is no public information available concerning the safety and security situation for other nuclear-weapon States, it is likely that much of their stockpiles consist of weapons that resemble the older, less sophisticated American systems rather than the more advanced models.

Of course, a nuclear accident or terrorist incident in peacetime would be extremely unlikely to result in a war-threatening inter-State conflict. But during the tension and confusion of a crisis, such an event might be misinterpreted by either or both sides as a deliberate hostile act. Expert analyses suggest existing communication systems designed to prevent such misunderstandings—including the now-famous "Hot Line"—could prove inadequate in many circumstances.²²

Naval Nuclear Weapons

The risk of an accidental launch is particularly acute with respect to nuclear weapons carried by forces at sea, which uniquely lack critical security and safety features built into virtually all other nuclear-weapon systems. The most important of these are the so-called permissive action links (PALs), electromechanical devices which prevent the detonation and sometimes even the arming of a nuclear warhead without the insertion of a special unbreakable code that must come directly from the National Command Authority.²³ The more recent types are built into the weapon in such a way as to make them impossible to bypass, and any attempt to do so would result in the permanent disabling of the weapon. Secondary devices known as coded switch systems are sometimes built into weapons delivery systems to prevent them from being fired or acti-

vated. All American and Soviet bombers that carry nuclear payloads, and all land-based strategic and tactical missiles, are equipped with some version of these devices.

Not so nuclear weapons carried by naval forces. The United States Navy—and, apparently, its Soviet counterpart as well—has always successfully argued that difficulties in communicating long coded messages to naval units precluded the installation of PALs on seaborne nuclear weapons. Reinforced in this policy by the long-standing naval tradition of “not taking rudder orders from the beach”, procedural safeguards are substituted for physical ones. Multiple authentication of orders by the captain and a number of senior officers via elaborate systems of safes, keys and codes are used to guard against unauthorized launch. Nevertheless, there is nothing to physically prevent the officers and crew of nuclear-equipped naval units from launching their weapons without orders, a fact recently dramatized in the movie *Hunt for Red October*. It is disturbing to note that during Congressional testimony in 1983, Admiral W. Holland answered a question about the issue of political control over naval nuclear weapons by remarking, “We have not yet come to grips with that part of the problem.”²⁴

In fact, the size, potency and special strategic importance of the submarine-launched ballistic missile force make it the focus of uniquely rigorous personnel selection policies and other procedural precautions designed to thwart unauthorized actions. Its strategic role as a reserve force not designed for action in the opening stages of a conflict, combined with the operational imperative to avoid all contact with enemy units, has helped to make these measures effective.

There is more reason to worry about other seaborne nuclear weapons. Tactical nuclear weapons of various types are carried aboard a variety of Soviet and American

naval vessels, including surface battle groups and attack submarines that would be among the first units to be engaged in a conflict.²⁵

An even greater potential threat is long-range nuclear cruise missiles, whose conventional counterparts proved so accurate and effective in the recent Gulf war. Both the United States and the Soviet Union plan to deploy hundreds of even more advanced nuclear cruise missiles aboard cruisers and attack submarines. A verifiable limit on their numbers has not yet been agreed to, nor will it likely be part of the package defined in the strategic arms reduction (START) treaty. The improved *Los Angeles* class attack submarines now entering service are all equipped with a vertical launch pod carrying up to 12 TLAM-N nuclear cruise missiles, and more can be fired from torpedo tubes. The new models of the *Ticonderoga* class AEGIS cruisers can fire the TLAM-N, as can the *Iowa* class battleships. On the Soviet side, the *Sierra*, *Akula* and *Oscar* class nuclear attack submarines are all equipped to launch the new SS-N-21 land attack cruise missile.²⁶ The effect will be to increase by a factor of three or four the number of naval units with strategic nuclear capability, and to distribute long-range nuclear weapons more widely among front-line forces, all of which seriously aggravates the risk that an accidental nuclear war might begin at sea.

The Special Risks Posed by Nuclear-Capable Submarines

The risk posed by the growing number of strategic nuclear weapons with lower levels of safeguards against misuse is particularly acute with regard to attack submarines. This is so because of the strategic missions assigned to submarine forces, their uniquely uncertain and dangerous tactical environment, and the near-impossibility of

maintaining communications with, and control over, submerged submarines.

Because modern submarines are so difficult to detect and locate, they can perform very intrusive and aggressive missions without being noticed. Were these same missions to be undertaken by more visible forces, they might provoke diplomatic conflict, retaliation, or perhaps even an armed clash. They can be used to trail and monitor an opponent's surface and subsurface units, or for clandestine intelligence-gathering in his home waters. There is considerable evidence that both American and Soviet submarines have been used in this way, and that this has created a "combat culture" among submariners on both sides, leading them to behave routinely as though they were virtually at war. The resulting aggressive patrolling and manoeuvring have led to some terrifyingly close calls and at least one catastrophe.

The new quieter Soviet subs can now penetrate the anti-submarine warfare (ASW) screens of American carrier battle groups; one recently surfaced unexpectedly only a few hundred metres behind one carrier.²⁷ American submarines operate even more aggressively; in 1986 the USS *La Jolla* violated Soviet territorial waters several times, and nearly collided with Soviet submarines while manoeuvring in a style "that would rival John Wayne".²⁸ The same year another *Los Angeles* class submarine actually collided with the Soviet *Delta IV* submarine it was trailing.²⁹ In 1970, a similar collision between the USS *Tautog* and a Soviet *Echo-II* class missile submarine was catastrophic; the Soviet boat sank with all hands.³⁰

If routine patrols and exercises can result in fatal confrontation, one can only imagine the perils in the terrifying circumstances of a nuclear alert. This is particularly true in the undersea environment, where the perils are greater and where acquiring reliable tactical information

is almost impossible. Submarine combat means almost certain death for the loser, and under water the hunters are always the hunted as well, since the very tactics used to detect and destroy enemies may cause them in turn to be detected and destroyed in that literally opaque battle environment.³¹ A submarine must rely almost entirely on the ambiguous information provided by passive sonar, with the result that "no environment so severely imposes the 'fog of war' as the undersea battleground",³² and each side imagines an attacker "to be anywhere or everywhere".³³ On one occasion, a NATO submarine commander almost attacked a fishing fleet when acoustic distortion led him to believe it was a Soviet submarine, and there are many instances in which the use of defensive measures such as acoustic decoys by one side have been misinterpreted as possible torpedo attacks.

All of this is further aggravated by the difficulties in communicating with submarines. Without risking his boat by trailing a visible and noisy antenna, a submarine commander can only receive slow low-frequency messages, and cannot transmit. He will be largely ignorant of unfolding events, and headquarters may be ignorant of his fate. Once a crisis is well under way, command authority will lose virtually all control over the undersea battle. In the nuclear alert accompanying the 1973 Yom Kippur war, United States and Soviet submarines remained engaged for weeks after the crisis formally ended.³⁴ More recently during the Falklands war, the HMS *Conqueror* sank the Argentine cruiser *Belgrano* without an explicit order from political authority as the result of a communications confusion, and the result was an irreversible escalation of the war.³⁵

Thus, there can be little doubt that the growing proliferation of strategic-capable nuclear cruise missiles aboard attack submarines that often operate virtually outside the C³I loop constitutes perhaps the most acute risk of

accidental nuclear war. The danger will be multiplied by the simultaneous *horizontal* proliferation both of nuclear weapons and of submarines. Even conventional submarines can provide an effective long-range delivery system for nuclear weapons, and they are much more abundant among potential nuclear-weapon States than long-range ballistic missiles.³⁶ Moreover, their stealth might make it difficult or impossible to identify the perpetrator of an attack, especially if the culprit submarine is a model operated by several nations. In the tense circumstances of a crisis, a nuclear or even a conventional submarine attack by a third party might result in a fatal escalation on the mistaken belief that the opponent had launched an attack.

A Nuclear Civil War?

There is, finally, a major accidental war risk factor—a breakdown of order within a nuclear-weapon State. This is potentially the most serious risk while being at the same time the most difficult to evaluate.

Even the most pessimistic and worst-case scenarios outlined above have taken for granted thoroughgoing efforts to maintain tightly centralized national control over nuclear stockpiles and the enforcement of strict obedience up and down the nuclear hierarchy. Independent of any political disputes or internal dissension, the leadership groups in nuclear-weapon States are united in their determination that nuclear C³I be kept above the fray, and so far these efforts have been successful.

If internal political tensions were to escalate into armed conflict, or even an all-out civil war, this heretofore secure assumption could erode dramatically. The opportunities for rebel military units or regional armed uprisings to seize nuclear weapons and threaten their use are of course powerfully constrained by the existence of PALs. But if the loyalty of the nuclear command structure itself

should fracture, this restraint might be removed. For example, if a split developed within the national command authority itself, or even at a high level within the armed forces, nuclear security could be quickly compromised. This is not idle speculation; during the political turmoil in China in 1989, many analysts worried privately that nuclear-armed units might actually fight each other, and for a period of several weeks were unable to assure themselves that a divided political leadership would be able to maintain centralized control of their weapons.

In this context the lack of PALs on most naval nuclear weapons assumes particular importance. Even if a civil war left the nuclear command structure intact, rebel naval units might be able to use their weapons to influence the outcome of a conflict.³⁷ If there were a struggle for control within these units, the risk of an inadvertent or unauthorized launch would be enormously increased.

The risk is not only that a handful of weapons could fall into rebel hands or actually be used in the struggle, bad enough though this would be: perhaps a greater danger is the *international* crisis that would be precipitated by a perceived breakdown in nuclear control; in all likelihood, other nuclear-weapon States would respond by alerting *their* nuclear forces as a precaution, which move itself reduces the "negative control" of national command authority. The result would all too likely be a self-feeding spiral of increasing tensions, uncertainty and loss of control which would increase enormously the risk of an accidental launch.

Some Policy Recommendations

Policy recommendations to reduce the risk of accidental nuclear war follow directly from the specific dangers enumerated above.

To begin with, there can no longer be any justification for the high levels of readiness of United States and Soviet nuclear forces. Given the fact that a deliberate nuclear attack or even a conventional war between these two Powers can now be virtually ruled out, only those nuclear forces sufficient for minimal deterrence need be maintained at high readiness. The number required for this purpose has been the subject of endless debate among strategists, but certainly a maximum of 2,000 strategic warheads for each side mounted on the least vulnerable delivery systems (ballistic missile submarines and mobile ICBMs) would be sufficient. This represents only 20 to 30 per cent of the forces currently at high-readiness levels.

Such a reduction need not await a formal arms control treaty. Remotely verifiable "demobilization"—consisting of such steps as reduced rates of bomber missions and submarine patrols, or the physical separation of some warheads from their delivery systems—could begin with informal bilateral agreement or even unilateral initiative, with their final destruction awaiting a treaty. "Fast tracking" nuclear demobilization in this way can provide a quick and secure route to a reduction of the accidental war risk.

Reducing the numbers of active systems by itself reduces the magnitude of the human reliability problem, but additional measures can and should be taken. Recent advances in cognitive psychology allow the objective measurement of an individual's ability to cope with complex and stressful tasks, and how well that ability holds up under external stress.³⁸ The application of such testing procedures to personnel with nuclear security and command responsibilities—including the political leadership—should be explored.

At the same time, great caution should be taken in introducing automated systems into the nuclear command loop, especially artificial intelligence systems. Given the

elimination, with the INF Treaty, of short flight time systems, the abandonment of pre-emptive strategies, and the virtual demise of the American Strategic Defense Initiative, there is no longer any plausible rationale for such systems.

Another step that would greatly reduce the risk of accidental war would be the elimination of most *tactical* nuclear weapons. These have in any case lost most of their *raison d'être* with the end of United States-Soviet confrontation in Europe, and it is hard to imagine their use in any foreseeable regional conflict. The United States Navy is already in the process of decommissioning most of its tactical nuclear weapons, and there would seem no good reason why the other armed forces—and those of other nuclear-weapon States—should not follow suit. As with a reduction in strategic nuclear readiness, this would not have to wait for a completed arms control treaty.

Another important measure would be the placing of PALs on all naval nuclear weapons. The small tactical penalty to be paid as a result of the inevitable communications delays surely no longer outweighs the risks of operating large numbers of weapons without these critical physical safeguards.

Even if PALs are installed on naval nuclear weapons, there would seem to be no compelling rationale for multiplying the number of strategic-capable naval nuclear weapons and platforms. Cruise missiles—especially on attack submarines—pose serious problems of arms control verifiability, increase the risk of accidental launch, and have no discernible advantage over ballistic missiles as a deterrent force. Some analysts have already noted that a reduction in the number of nuclear-powered attack submarines, along with limits on the sale or transfer of submarines to other States, may in any case be necessary to protect the

smaller ballistic missile submarine force remaining after the cuts mandated by the forthcoming START treaty.

Finally, there is clearly no simple or transparent solution for dealing with the potential nightmare of civil disorder in nuclear-weapon States. It is therefore this author's urgent recommendation that an international panel of technical experts be convened to study the problem and make specific recommendations concerning unilateral and multilateral measures that might be taken to prevent an accidental war from beginning in this way.

One avenue that might be explored is the development of PALs whose status could be queried by a remote signal. This would enable the leaders of other nuclear Powers—and perhaps an international agency or authority—to determine whether the nuclear weapons in the affected State were securely locked. The ability to obtain this information could act as an important confidence-building measure to help prevent a "nuclear involved" civil conflict from manufacturing an international crisis. It would also serve as a powerful deterrent against those who might be tempted to obtain or use these weapons illicitly.

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Africa as a Nuclear-Weapon-Free Zone

Prospects for a Nuclear-Weapon-Free Zone in Africa

Bariyu A. Adeyemi

"Nuclear weapons pose the greatest danger to mankind and to the survival of civilization. It is essential to halt and reverse the nuclear arms race in all its aspects in order to avert the danger of war involving nuclear weapons. The ultimate goal in this context is the complete elimination of nuclear weapons."¹

When, in 1978, representatives at the tenth special session of the United Nations General Assembly in their collective wisdom made the ideal of the complete elimination of nuclear weapons their ultimate goal, they undoubtedly recalled the awesome lethality of the nuclear bombs that had laid Hiroshima and Nagasaki waste in the closing stages of the Second World War.

Even before that epoch-making special session, the efforts of the international community had been geared towards reducing the dangers posed by such lethal devices, which constituted a threat to the very survival of mankind. However, strategies for reducing the danger of nuclear catastrophe invite a number of varying approaches. Re-

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gional measures to halt and reverse the proliferation of nuclear weapons in specific regions by establishing nuclear-weapon-free zones (NWFZs) have been one of the most salient and practical of such approaches. This concept has figured prominently in resolutions of the United Nations General Assembly at successive sessions. For example, on 11 December 1975, the General Assembly, at its thirtieth session, adopted resolution 3472 B (XIII), which stated, *inter alia*:

"nuclear-weapon-free zones constitute one of the most effective means for preventing the proliferation, both horizontal and vertical, of nuclear weapons and for contributing to the elimination of the danger of a nuclear holocaust".

In successive years, the General Assembly adopted resolutions on NWFZs as they related to different regional and geographical zones. In 1975 the Assembly went even further. It invited 21 intergovernmental experts to conduct what was termed a comprehensive study on the question of nuclear-weapon-free zones in all its aspects.² But it was during the tenth special session devoted to disarmament that the General Assembly adopted its most important document on the subject of NWFZs. It proclaimed:

"The process of establishing such zones in different parts of the world should be encouraged with the ultimate objective of achieving a world entirely free of nuclear weapons."³

The main proposals in this regard have sought to establish such zones in Latin America, Africa, South Asia, the Pacific, the Indian Ocean, Central Europe, the Balkans, the Adriatic, the Mediterranean, Northern Europe and the Middle East.

In a rapidly evolving world order in which interdependence is fast becoming the norm, global security is becoming symbiotically related to, if not totally dependent

on, regional security. Sporadic regional disputes, under such conditions, can more readily spill over to, and encompass, those nuclear Powers external to the region, culminating in a catastrophic nuclear confrontation. International security is therefore interrelated with, if not dependent on, regional security. Thus the establishment of nuclear-weapon-free zones would assuredly make a positive contribution, not only to the non-proliferation régime in general and to the prevention of the spread of nuclear weapons in particular, but also to the limitation of the nuclear arms race. Although the primary purpose of a nuclear-weapon-free zone is to:

“enhance national and regional security, it should also be seen as a part of the process of averting nuclear weapon proliferation, of arresting the nuclear arms race, and of diminishing the danger of nuclear war. Thus with this process the interests of all States are involved.”⁴

It is for such reasons that regional initiatives such as the establishment of NWFZs have gained increasing international recognition. Some may view such regional initiatives as falling within the framework of disarmament measures proper. Others may see them as mechanisms that are complementary to collateral measures of disarmament, such as the non-proliferation of nuclear weapons, confidence-building measures, and the development of peaceful uses of nuclear energy. But in whatever manner and by whatever yardstick the concept of NWFZs is assessed, it is virtually impossible to resist the conclusion that nuclear-weapon-free zones constitute:

“a potentially useful instrument of reducing the possibilities of a nuclear war, diminishing the risks of a nuclear arms race, and consolidating universal efforts to strengthen international peace and security

in an interdependent but precarious global environment".⁵

Even a minimal definition of a NWFZ will contain references to the prohibition of the importation, deployment or development of any nuclear weapons by all members inside the zone. But a more comprehensive definition of the concept can be found in General Assembly resolution 3472 B (XXX), adopted on 11 December 1975, which states, in part, as follows:

"A 'nuclear-weapon-free zone' shall, as a general rule, be deemed to be any zone recognized as such by the General Assembly of the United Nations, which any group of States, in free exercise of their sovereignty, has established by virtue of a treaty or convention whereby:

"a The statute of total absence of nuclear weapons to which the zone shall be subject, including the procedure for the delimitation of the zone, is defined;

"b An international system of verification and control is established to guarantee compliance with the obligations deriving from that statute."⁶

All the same, there should be no doubt in our minds as to the serious limitations inherent in NWFZs as a reliable disarmament measure. The concept of NWFZs is, at best, only a means towards an ultimate end. Without requisite collateral measures, NWFZs will hardly be viable as a credible security arrangement. The Norwegian scholar, Johan J. Holst, stated in 1983:

"A NWFZ constitutes no panacea. It cannot substitute for a national security policy, nor can it remove the threat of nuclear war. It is primarily a confidence-building measure which needs to be tailored to the specific circumstances of the region in question and to the links which exist between that

region and broader systems of international order. It is a possible instrument in support of broader purposes."

It must always be borne in mind that the concept of NWFZs can help in controlling nuclear weapons; it cannot eliminate them. The issue of control versus elimination is therefore, in this context, cardinal. Some analysts even view NWFZs as laying a basis for an unstable and dangerous situation by rendering the region victim to its own power distribution, especially when some members enjoy superiority in the conventional field, thereby giving rise to relatively greater instability whereby a weaker State in the region would be unable to resist the temptation to use nuclear weapons in the event that it felt gravely threatened by another State that had marked superiority in conventional weapons.

Be that as it may, the concept of NWFZs, when reinforced with other arms control and disarmament initiatives, offers a basis for avoiding the dangers of nuclear war, the proliferation of nuclear weapons and a threat to world peace and security. NWFZs present an incremental but important achievement towards international stability. If the realization today of the goals of general and complete disarmament seems unattainable in a world governed by political tension, mistrust, and lack of negotiations on fundamental arms control and arms reduction measures, NWFZs can lay the groundwork by increasing confidence as regards a better future.

Denuclearization of Africa

We have analysed the concept of nuclear-weapon-free zones and considered its usefulness as a regional security measure: it is apposite now to trace the origins of this concept on the African continent. The aim is to determine whether such a concept is a viable regional security

measure that all African States should embrace in their short- and long-term interest and, more important, to explore whether a structured NWFZ in Africa that is organically linked to other collateral security measures at the global level would enhance the cause of general and complete disarmament which the United Nations has long set as the ultimate objective of the international community.

The proposal to establish a NWFZ in Africa was made in 1960 following a French nuclear test in the African Sahara. One year later, by its resolution 1652 (XVI) of 24 November 1961, the General Assembly called on all States to refrain from conducting any nuclear tests in Africa and from using the continent to test, store or transport nuclear weapons, and to respect the status of Africa as a NWFZ.

In Cairo, in 1964, the Assembly of Heads of State and Government of the Organization of African Unity (established the previous year) adopted the Declaration on the Denuclearization of Africa.⁷ Undoubtedly, the African heads of State and Government intended, in that historic decision, to fulfil two basic obligations: first, the conclusion of an agreement (although no time frame was stipulated), under United Nations auspices, not to manufacture nuclear weapons; and secondly, the call on all major nuclear Powers to respect the principles and provisions of the Declaration. In 1965 the General Assembly, by its resolution 2033 (XX) of 3 December 1965, endorsed the Declaration and called upon all States to desist from testing, manufacturing or deploying nuclear weapons in Africa.

Thereafter the resolution was submitted annually to the General Assembly, with some cosmetic changes reflecting any new developments on the African scene as they related to the Cairo Declaration. The twin issues of the call on all States to respect the African NWFZ and of the Declaration on the denuclearization of the continent steadfastly continued to feature prominently in the resolu-

tions submitted to the General Assembly every year from 1965 on. The need to prevent the proliferation of nuclear weapons from spilling even onto the African continent remained a cardinal factor in the collective security strategy of African Governments. It was not surprising therefore that a large number of African States embraced the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) as soon as it was concluded in 1968 and when it entered into force in 1970. At the time of the Fourth Review Conference of the NPT in 1990, some 40 States out of 51 independent countries in Africa had become States parties to the NPT, representing a record 80 per cent of the African States.

The NPT was conceived as a centre-piece of international non-proliferation efforts. At the time of its creation, the NPT was seen as the boldest attempt to use a multilateral approach to balance concerns for international security with the desire to use nuclear energy for peaceful purposes. The operative articles of the Treaty clearly demonstrate the need to balance the rights, obligations and benefits of the parties. The main objective of the Treaty is to prevent the spread of nuclear weapons to States that do not possess them. Another primary objective of the Treaty is to provide for co-operation in the peaceful uses of nuclear energy, consistent with the objective of non-proliferation.

Article VI of the Treaty, however, imposed an obligation on the nuclear-weapon States. By it they undertook to pursue negotiations in good faith on effective measures relating to cessation of the nuclear arms race at an early date and to nuclear disarmament, and on a treaty on general and complete disarmament under strict and effective international control. It is the monumental failure of the nuclear-weapon States to deliver on this key issue after two decades that triggered a justified sense of indignation

and even betrayal among developing countries, including those in Africa which signed the NPT. It was in protest to that unsatisfactory state of affairs that developing States parties to the NPT were motivated to block agreement on a final declaration, at both the Second Review Conference, in 1980, and the Fourth Review Conference, in 1990.

None the less, in spite of this flaw in the record of the operation of the NPT, there is general agreement that the existence of the Treaty has helped immensely in decelerating the spread of nuclear weapons at least horizontally. The existence of the Treaty is also seen as a key factor in reinforcing international public opinion, which tended to mirror the acquisition of nuclear weapons by new States as being contrary to international norms and to the interests of global security and stability, to which Africa's regional security and political stability are intrinsically linked.

It is against such a background that South Africa's destabilization policies, including the *apartheid* régime's criminal record of naked aggression against the African front-line States, can best be assessed as a major stumbling-block in the way of the establishment of an African NWFZ. It is also pertinent to observe that some fairly credible evidence has emerged that South Africa, through its clandestine nuclear programme coupled with a growing military arrogance in the late 1970s and the decade of the 1980s, might well have acquired a nuclear capability in a grand design to silence opposition at home and to intimidate neighbouring sovereign African States through nuclear threats and blackmail. Pretoria's refusal both to sign the NPT and to conclude a safeguards agreement with the International Atomic Energy Agency (IAEA) has further strengthened the suspicion that South Africa seemed intent on acquiring a nuclear-weapon capability. African countries could not ignore the South African factor in their effort to transform their concept of a NWFZ into that of a

legally binding instrument such as the Treaty of Tlatelolco, which declared Latin America a nuclear-weapon-free zone. A United Nations publication entitled *Study on All the Aspects of Regional Disarmament* describes the regional and global purposes of the Treaty of Tlatelolco in this way:

"... On the one hand, the Treaty was designed to strengthen peace and security in the region, to avert the possibility of a regional nuclear weapons race, and to protect the parties against possible nuclear attacks. At the same time, it was conceived as a significant contribution towards preventing the proliferation of nuclear weapons and as an important factor for general and complete disarmament."⁸

The Treaty of Tlatelolco thus provides an example and a classic model of the way in which a United Nations resolution can pave the way for the realization of a NWFZ in a given or designated area through the international treaty process. Unfortunately for African States, South Africa's conduct and blatant defiance of the United Nations resolutions meant that it could not be associated with the negotiations for establishing such a zone, nor could the Pretoria régime be realistically ignored in any negotiations for a credible mechanism such as a NWFZ designed to guarantee security and stability on the continent.

Be that as it may, the South African situation should not be allowed to frustrate the progress towards the establishment of a NWFZ in Africa, for indeed, there are other strong inducements on the part of African States for an early concretization of regional security mechanisms that are both affordable and reasonably dependable, given the greater need on the part of African countries to make better use of their scarce and dwindling resources in the greater interest of economic growth and development.

Recent studies point conclusively to the fact that, in spite of prevailing economic difficulties, African States still

spend a rather disproportionate amount of their resources on the importing of armaments. Africa's share of world military expenditure in 1959 represented only a token 3 per cent of the expenditure by the entire third world. By 1979, it had risen to 25 per cent of the expenditure by the entire third world. Thus Africa had its share of the arms sales explosion of the mid-1970s and early 1980s. The relationship between arms purchase and resource availability as distinct from actual security requirements by third world countries is best illustrated by the following figures. The value of arms sales to the third world in the 1970s rose to the staggering level of \$286 billion, or four times the value in the previous two decades. That figure, it is instructive to note, is much higher than Africa's current crushing external debt burden of \$218 billion or about 26 per cent of total third world external indebtedness, which is plaguing not only the economic but also the political viability of the debtor countries.

For Africa, the economic consequences of such massive acquisition of arms in the 1970s and the early 1980s have been devastating. Africa received no benefits from such acquisitions. Unlike other developing countries in Asia and Latin America, the continent did not even derive any benefit from a transfer of technology.

In the last two decades, some developing countries, taking advantage of the technological expertise acquired from arms transfers, have emerged as competitors in the arms sales market. But only Asian and Latin American countries have carved out credible positions for themselves in the arms sales market. Except for South Africa, which has had all the advantages of collaboration in the development of its arms industry, and with the possible exception of Egypt, no African country has featured among serious arms producers.

In the prevailing unfavourable international economic environment characterized by a decline in commodity prices (from which the majority of African States derive their foreign exchange), unfavourable terms of trade, high interest rates and volatility in exchange rates, compounded by a crushing debt burden, not to mention the perennial and aggravating haemorrhage in development resources, African States can ill afford the prevailing huge capital outlays, all in the name of security.

None the less, it is instructive to remember that Africa is an integral part of the international community and cannot, at least to that extent, be expected to take steps out of harmony with the rest of the world. Disarmament in Africa—which undoubtedly should help to facilitate meaningful growth and development on the continent—can have full meaning and effect only as part of the global process. Conventional disarmament, to have its full effect, needs to be addressed globally, in harmony with major steps taken in Europe, the acknowledged centre of the arms race. The recent progress made in negotiating the Treaty on Conventional Armed Forces in Europe (CFE), which would have a positive impact on that continent from the Atlantic to the Urals, should also have consequential effects in other regions, including Africa. Success in the negotiations in respect of CFE was already crystallizing into a restoration of mutual trust and confidence as well as a general reduction of tension and a dilution of ideological rivalries and super-Power competition, if not confrontation.

In the circumstances, Africa's main security preoccupation could then be reduced to the mere acquisition of military hardware essential for the protection of sovereignty but at the lowest military level.

Fortunately, the noticeable easing of super-Power rivalry and competition has also had a positive impact in

Africa, with President De Klerk taking some encouraging steps towards dismantling *apartheid* in South Africa. The recent dramatic announcements from Pretoria on 1 February 1991 promising the abrogation of the obnoxious core *apartheid* legislation, such as the Land Acts, the Group Areas Act and the Population Registration Act, have raised hopes for an early emergence of a united, non-racial and democratic South Africa that would soon be able to rejoin the comity of nations.

In that event, African States will be emboldened to embark on regional security arrangements that will peg military outlays at the lowest level without the risk of diminished security. In the prevailing international economic environment, in which Eastern Europe has emerged as a major competitor for the dwindling global resources available for development, Africa needs to garner and manage prudently its own scarce foreign exchange in furtherance of the superior goals of economic growth and sustainable development. It is also in this context that the final concretization of the concept of a nuclear-weapon-free zone for the whole continent seemed feasible, since such a zone would include a South Africa that is essentially sanitized from *apartheid*. By modelling such a NWFZ concept on the spirit and letter of the Treaty of Tlatelolco, African States would also have succeeded in eliminating, perhaps for all time, the threat that any part of the continent could ever become a target for nuclear attack, intimidation or blackmail.

Fortunately, all of the elements necessary for the establishment of a credible NWFZ in Africa are abundantly present. Some 40 out of the 51 African States—80 per cent of the entire continent—have already become parties to the NPT. The front-line States are poised to follow suit as soon as South Africa obliges by signing up as well. And the prospects for an African NWFZ have been

further brightened in the rapidly evolving political developments in Pretoria itself against the background of heightened expectations triggered on 1 February by President De Klerk's dramatic announcement of his Government's intention to abrogate the residual core *apartheid* laws. In sum, the political climate in the African region seems auspicious for embarking on serious negotiations that would eventually crystallize into a nuclear-weapon-free zone embracing the entire African continent. African Governments would be well advised to take full advantage of the current favourable wind in international relations if this unique opportunity for shoring up Africa's security apparatus with a credible NWFZ is not to be lost.

It is well known that the acquisition of weapon-grade enriched uranium begins invariably as a spin-off from an ongoing nuclear programme ostensibly slated for peaceful purposes. Would it not be more sensible to avoid being caught in a situation in which a given State yields to the temptation to manufacture nuclear weapons for political reasons especially since it is now generally acknowledged that a nation's security can no longer be guaranteed by the acquisition of nuclear weapons? In any event, given the prohibitive cost of embarking on any form of nuclear programme even for peaceful purposes, and taking into account the grim possibilities of accidents such as those of Three Mile Island in the United States and Chernobyl in the Soviet Union, African States would be better off seeking alternative sources of energy which are feasible and affordable, such as solar energy. If well developed, solar energy has the potential to supply electricity even to Africa's remotest villages at economical rates.

The central challenge in Africa today is not over the nuclear option *per se*. Other challenges facing the continent seem endless: how to feed the hungry and the malnourished; how to get out of the strait-jacket of debt; how to

combat the menace of locusts through the use of suitable and efficacious pesticides; how to provide basic social and health facilities; and how, after two and a half decades of political independence, to attain effective economic sovereignty.

In all these problems, the rational priority is, arguably, not the acquisition of the nuclear capability, whether for prestige, national self-image, deterrence or security. Instead, priority ought to be accorded to economic development by African Governments. Funds earmarked for prestigious nuclear programmes could more sensibly and profitably be utilized in the productive sectors of Africa's economies to stimulate economic recovery and growth in real terms. These are the factors that make the case for nuclear non-proliferation anchored on a credible NWFZ embracing the entire African continent virtually unassailable. By guaranteeing the zone against nuclear attack, threat or blackmail, the two super-Powers and their respective allies, in the new positive spirit of close *rapprochement* in their bilateral relations in the post-cold-war era, would thereby strengthen Africa's security in particular and, to that extent, reinforce international peace and security in general.

Notes

- 1 Final Document of the Tenth Special Session of the General Assembly, the first special session devoted to disarmament (General Assembly resolution S-10/2), para. 17.
- 2 General Assembly resolution 3261 F (XXIX) of 9 December 1974.
- 3 General Assembly resolution S-10/2, para. 61.
- 4 Mahmoud Karem, *A Nuclear-Weapon-Free Zone in the Middle East: Problems and Prospects*. Contributions in Military Studies (November 1965) (New York; Westport, Connecticut; and London, Greenwood Press), p. 4.
- 5 *Ibid.*, p. 6.
- 6 See also Special Report of the Conference of the Committee of Disarmament (CCD/476) (28 August 1975).

- 7 *Official Records of the General Assembly, Twentieth Session, Annexes*, agenda item 105, document A/5975.
- 8 *Study on All the Aspects of Regional Disarmament*, United Nations Study Series 3 (United Nations publication, Sales No. E.81.IX.2), para. 22.

Africa as a
Nuclear-Weapon-Free Zone

Implementing a Nuclear-Weapon-Free Zone in Africa

David A. V. Fischer

The Prospects for an African Nuclear-Weapon-Free Zone

Hopes that a nuclear-weapon-free zone in Africa might at last be in prospect were raised by a statement by the South African Government on 17 September 1990. The significant passages read:

"Various African States have recently expressed the view that the African continent should become a nuclear weapons free zone. . . . The South African Government welcomes these suggestions. Indeed the South African Government has itself consulted a number of African Governments on the desirability of establishing a nuclear free zone at least in the Southern African region. Such a move would further remove suspicions and should strengthen the economic and geographical cohesion of the region. . . . the South African Government is prepared to accede to the [non-proliferation] Treaty in the context of an equal commitment by other states in the Southern African region."

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The statement did not indicate what other States were meant. It did, however, welcome the accession of Mozambique to the non-proliferation Treaty (NPT) on 12 September 1990 as "one of South Africa's closest neighbours", the implication being that South Africa was awaiting the accession of other close neighbours.

The statement went on to say that

"... the Government trusts that in the near future talks can commence with the International Atomic Energy Agency on concluding a comprehensive safeguards agreement on the country's nuclear facilities".

The first round of discussions with the International Atomic Energy Agency (IAEA) took place in mid-February 1991 and it is understood that the results were satisfactory.

Fundamental Elements of a Nuclear-Weapon-Free Zone

The General Assembly has defined a nuclear-weapon-free zone as a zone "recognized as such by the General Assembly" in which a treaty or convention drawn up by the States concerned, "in the free exercise of their sovereignty," requires "the . . . total absence of nuclear weapons" and "an international system of verification and control . . . to guarantee compliance . . .".¹

In the resolution the General Assembly also called upon the nuclear-weapon States to undertake by treaty to respect the total absence of nuclear weapons from the region, to refrain from contributing to a violation of the zonal treaty and to refrain from using or threatening to use nuclear weapons against any zonal State (that is, to provide "negative security assurances" to the parties to the treaty).

Hence the chief elements to be considered in creating a nuclear-weapon-free zone for any region include:

- Its geographical scope;
- The basic obligations to be accepted by parties, by extra-zonal States that control territories in the zone, and by the nuclear-weapon States;
- Additional requirements that might be appropriate for the region;
- Arrangements that should be made for verification of compliance with the basic obligations;
- The steps that should be taken to bring the zone into existence;
- The possibility of linking it with other nuclear-weapon-free zones.

The Geographical Delimitation of an African Nuclear-Weapon-Free Zone

Continents, Oceans and Subregions

In the nuclear context the principal characteristic of Africa is that, although it is second to Asia in size, only five States possess nuclear plants and that, apart from some small research reactors, all these plants are in one State, South Africa, which is also the only State that has today the technical ability to make nuclear weapons.² Other features are that no extraregional State except Spain³ controls territories on the continent of Africa and that since the early 1960s no nuclear tests have been carried out in Africa or contemplated there by any nuclear-weapon State.

These characteristics should make it less difficult than in the case of the nuclear-weapon-free zones of the South Pacific (where nuclear testing continues) and Latin America (where extraregional States still possess sizeable territories) for the nuclear-weapon States to accept the banning of nuclear tests in the zone, to respect the nuclear-free status of the zone and, depending on the maritime

coverage of the zone, to apply its statute to territories under their control.⁴

The most extensive concept of an African nuclear-weapon-free zone would cover all of continental Africa and all of the islands possessed by continental States as well as the island members of the Organization of African Unity (OAU), the territorial waters of all the States concerned and the adjacent seas and oceans. A less extensive concept would leave out, at least initially, the adjacent seas and oceans. Both these concepts have the advantage that the geographical concept of Africa is exceptionally well defined. This is seldom the case in other regions proposed as the subject of nuclear-weapon-free zones. A third possibility would be to create one or more subregional nuclear-weapon-free zones, for example south of the Sahara desert or south of the equator, with or without their adjacent oceans.

One of the first questions to be considered is whether there should or could be an overlap with the proposed Middle East nuclear-weapon-free zone. At a minimum the latter will include Egypt and the Libyan Arab Jamahiriya in its African part, but it may include the Sudan and the five Maghreb countries.⁵ In that case, it would also cover the small Spanish enclaves of Ceuta and Melilla.

There is no inherent reason why a State should not be party to two treaties creating nuclear-weapon-free zones provided that there is no conflict between its obligations under each treaty. However, some Arab States that are members of OAU might be reluctant to become members of an African nuclear-weapon-free zone until further progress had been made in defining the obligations that they might have to accept under a Middle East zone. Some might also fear that by joining an African zone they would be weakening the incentives to create a Middle East zone. They would then have accepted the constraints that a

nuclear-weapon-free zone imposes on its parties while leaving free from such constraints the only State in the Middle East that is assumed to have nuclear weapons, namely Israel.

Gradual Extension of Coverage

This situation argues for a gradual approach. For instance, the African States might establish a zone that would in principle cover all of Africa and that every member of the OAU would be eligible to join. The entry into force of the zonal treaty would not, however, be contingent on its ratification by the States on the Mediterranean littoral, the Atlantic Maghreb and the Sudan. All of the latter would be free to accede when they chose to do so. However, certain minimum conditions would have to be met. One of these is the membership of South Africa.⁶ Another would be to set the number of eligible States that must ratify the zonal treaty before it came into force and possibly to delimit a group of core countries, besides South Africa, whose adherence would also be a prerequisite for the entry of the treaty into force.

Maritime Limits

The South Pacific Nuclear Free Zone Treaty (the Treaty of Rarotonga) entered into force in 1986 when eight eligible States had ratified it. Its nuclear-free zone immediately covered a large and defined area of the South Pacific, extending southward to the limits of the Antarctic Treaty and eastward to the eventual limits of the Treaty for the Prohibition of Nuclear Weapons in Latin America (the Treaty of Tlatelolco). In contrast, the Treaty of Tlatelolco covers today only the territories (including the territorial waters) of the States that have brought it into force for themselves. It will eventually extend over a large area of the adjacent oceans but only when all eligible States have

brought it into force and when certain other conditions have been met.⁷

Once again there is a good argument for a gradual approach in defining the maritime limits of an African nuclear-weapon-free zone. The island States members of the OAU (and their territorial waters) should clearly be eligible to be members of the zone. However, one may question how meaningful it would be immediately to seek to extend the zone over large areas of the Mediterranean Sea frequented constantly by the warships of the nuclear-weapon States carrying nuclear weapons.⁸

It might raise fewer problems to extend the coverage of the zone in the South Atlantic Ocean⁹ so as to link up with Antarctica and the region that will eventually be covered by the Treaty of Tlatelolco. Here too there would be some question about the practical significance of such coverage. It would not prevent the innocent passage of warships carrying nuclear weapons. The testing of nuclear explosives under the South Atlantic as well as in the atmosphere above it is already prohibited by the partial test-ban Treaty. Verification of compliance with the requirements of a treaty over vast areas of ocean would also be an immense task. None the less, a link with the Antarctic and Tlatelolco nuclear-weapon-free zones might have a symbolic value (discussed below).

Bringing the Zone into Force

In gradually extending its own geographical scope, an African nuclear-weapon-free zone might select elements from both of the existing treaties. Once the minimum number of ratifications had been deposited—or the core set of countries had ratified—the treaty would enter into force (like the Treaty of Rarotonga) but only within the territories of those States that had ratified it or acceded to it (as in the case of the Treaty of Tlatelolco).¹⁰ But unlike

the procedures laid down by the Treaty of Tlatelolco, there should be no need for an African State to waive any of the provisions of the African treaty to bring it into force for itself nor should full entry into force have to await actions by extraregional States. Each eligible State would bring the treaty into force for itself by the act of depositing an instrument of ratification.

When all eligible States had acceded, the limits of the treaty might automatically be extended to cover areas of ocean to the west and south. These areas should be defined in the treaty itself and should make its limits contiguous with the region already covered by the Antarctic Treaty¹¹ and with that eventually to be covered by the Treaty of Tlatelolco. Soon afterwards, a conference of the parties might consider the question of extending the limits of the treaty so as to cover defined areas of the Mediterranean, the Red Sea and the Indian Ocean, taking account of progress made in establishing a nuclear-weapon-free zone in the Middle East and a "zone of peace" in the Indian Ocean.

Subregional Variants

A nuclear-weapon-free zone confined to sub-Saharan Africa or to the African States south or partly south of the equator would help to achieve, at least for many years, the paramount aim of ensuring the total absence of nuclear weapons from the African region since it would include the only State that now has the technical ability to manufacture a nuclear weapon. There might, however, be problems in delimiting the geographical boundaries of the subregion and in securing its recognition by the United Nations. The establishment of such a zone would also offer no enduring assurance of a nuclear-weapon-free zone covering all of Africa.

None the less the creation of such a subregional zone might be more easily and quickly achieved than the formal denuclearization of the entire continent and should not be ruled out. It might be an interim step towards the larger objective.

Most of the issues raised in the following part of this article would apply to a subregional zone as well as to a zone covering all of Africa.

Provisions and Prohibitions of a Treaty Establishing an African Nuclear-Weapon-Free Zone

Obligations under Other Treaties

To permit comparison, a brief summary is appended of the obligations that non-nuclear-weapon States accept under the NPT, and that the five nuclear-weapon and other extraregional States as well as the parties themselves accept under the Treaty of Tlatelolco and the Treaty of Rarotonga.

Essential Provisions and Prohibitions under an African Treaty

The treaty must require its parties to renounce the possession or acquisition of, or control over, any nuclear weapons by any means anywhere. Following the example of the NPT and the Treaty of Rarotonga, the parties to the African treaty must also explicitly renounce the use of nuclear explosives for all purposes. The Treaty of Tlatelolco's ambiguity about the right of its parties to make and detonate nuclear explosive devices for peaceful purposes has raised several problems and it is possible that in 1977, when Soviet and United States satellites detected South African preparations for a nuclear test, this test, like the Indian test of 1974, would have been justified as a

"nuclear explosion for peaceful purposes". This once-vaunted technology has now been abandoned by all of the nuclear-weapon States.¹² Following the example of the Treaty of Rarotonga, the parties to the treaty covering the African zone should also undertake not to seek or receive any assistance in the manufacture or acquisition of nuclear explosives or to assist or encourage the manufacture or acquisition of nuclear explosives by any other State.

The treaty should expressly prohibit the deployment or testing of any nuclear explosives by any State on the territories of the parties or anywhere else in the region.

The treaty should also require the nuclear-weapon States to provide "negative security assurances" to the parties, to respect the nuclear-weapon-free status of the parties and to refrain from contributing to any violation of the treaty. All extraregional States should also be required to apply the basic provisions of the treaty to any territories in the zone that they may control.

As in the case of the Treaties of Tlatelolco and Rarotonga, these undertakings of the nuclear-weapon and other extraregional States could be formalized in protocols to the treaty. However, the entry into force of the African treaty should not be made contingent upon the ratification of such protocols. A requirement along these lines in the Treaty of Tlatelolco partly explains why, 24 years after it was opened for signature, it is not yet in force for the region as a whole.

As in the case of the Treaty of Tlatelolco and the Treaty of Rarotonga, no limit should be set on the duration of the treaty concerning Africa. For reasons that will be explained later, the conditions for withdrawal should be more restrictive than in the case of the NPT or the Treaty of Tlatelolco, perhaps along the lines of the Treaty of Rarotonga, which permits withdrawal only in the case of a gross and explicit violation of the Treaty itself.¹³

Optional Prohibitions

The treaty might also expressly prohibit any armed attack by conventional or other means on any nuclear plant situated on the territories of its parties. An undertaking to refrain from such attacks might also be included in the protocols to be ratified by extraregional States.

The African exporters of nuclear plant and fuel are Gabon, Namibia, the Niger and South Africa. The draft final document of the fourth Review Conference of the NPT recommended that all supplying States should require full-scope safeguards¹⁴ as a condition of supply to non-nuclear-weapon States. It would therefore be appropriate to include such a clause in an African Treaty. However, the additional requirement of the Treaty of Rarotonga that nuclear exports to *nuclear-weapon States* must be subject to IAEA safeguards might cause difficulties for Gabon and the Niger, whose uranium exports are chiefly to France.

Dumping of nuclear waste at sea is not a problem in the Mediterranean (where it is banned) or in the South Atlantic or Indian Oceans. A clause forbidding sea-dumping would also raise the question of the treaty's coverage of adjacent oceans. This too seems to be a matter that could be left for later negotiations.

Verification, Controls and Sanctions

In view of the long experience of the IAEA in applying safeguards, and to avoid unnecessary expense, IAEA should be given the task of verifying that no party to a treaty on Africa was diverting nuclear materials to nuclear weapons or explosives. This could be simply accomplished by requiring (as the Treaty of Rarotonga does) that each party should conclude an NPT-model safeguards agreement with IAEA.

The Treaty of Tlatelolco foresees a somewhat elaborate regional control system that would require it to establish an inspectorate to carry out "challenge" inspections at the request of any party to the Treaty. Although the Treaty has now been in force in much of Latin America for twenty-four years, its parties have not found it necessary to set up this regional control system. It seems even more unlikely that a system of this kind would be needed in Africa. None the less it would be desirable to establish a small permanent authority, perhaps within the framework of the OAU, to provide the parties with continuing assurance that the main provisions of the African treaty were being complied with. To this end the parties might be required to make periodic reports to a central authority and to IAEA as well as reports on any unusual events. There might be arrangements for investigating complaints similar to those set out in the annex to the the Treaty of Rarotonga. The central authority might deal initially with any infraction of the treaty that was outside the scope of IAEA safeguards.

In place of a regional apparatus to carry out "challenge inspections" of the type foreseen in the Treaty of Tlatelolco,¹⁵ the treaty on Africa might provide that its parties would automatically permit IAEA to carry out the special inspections¹⁶ foreseen in paragraphs 73 and 77 of its NPT safeguards system. (Paragraph 77 provides that these inspections may be carried out anywhere in the State concerned but only with the prior agreement of that State.)

IAEA safeguards verify only that the non-nuclear-weapon States have not diverted nuclear material to nuclear explosives. Other violations of the NPT, the Treaty of Tlatelolco and the Treaty of Rarotonga are of course also conceivable. For instance, a party might clandestinely import a nuclear weapon, an extraregional State might use its territory in the zone for the manufacture or testing of a

nuclear weapon, or a nuclear-weapon State might threaten a party with nuclear attack. IAEA safeguards have little or no relevance to such violations. No satisfactory international system has yet been devised for detecting many of them. However, the treaty might provide that, if such a violation were detected or openly committed, the control authority of the treaty should promptly report it to the Security Council and the General Assembly of the United Nations as well as to IAEA.

Except for such infractions it would be simpler to follow the example of the NPT and the Treaty of Rarotonga and, in the case of diversion of nuclear material, to rely on the sanctions set forth in the safeguards agreements with IAEA.¹⁷

The Forum for Negotiating the Treaty

The treaties establishing the Latin American and South Pacific zones were drawn up at conferences of the prospective parties. In the case of the Treaty of Tlatelolco, the conference was also attended by representatives of the nuclear-weapon States, the extraregional States concerned, the United Nations and IAEA. The conferences considered drafts prepared chiefly by Mexico and Australia respectively. A similar conference would be an appropriate forum for drawing up an African treaty and the help of the United Nations and IAEA secretariats might be sought in drafting the treaty.

It seems unlikely, however, that other African States would wish to convene such a conference unless South Africa had already renounced nuclear weapons and accepted IAEA safeguards on all its nuclear activities.¹⁸ The first step for the creation of an African zone must be the accession of South Africa to the NPT. This could be accompanied or followed by the accession of other prospective parties, particularly those in southern Africa.

A De Facto Nuclear-Weapon-Free Zone

A *de facto* nuclear-weapon-free zone or subregional zone could be achieved simply by the accession of South Africa and of all the members of the OAU (or all those in the subregion).

This would require the accession to the NPT of the following States, of which those south or partly south of the equator are marked with one asterisk (*) and those north of the equator and south of the Sahara are marked with two asterisks (**): Algeria, Angola*, Dahomey**, Djibouti**, Mauritania, Namibia*, Niger**, United Republic of Tanzania*, Zambia* and Zimbabwe*.

Although universal accession to the NPT would help to ensure the total absence of nuclear weapons from the region or subregion, many of the desirable attributes of a nuclear-weapon-free zone would still be absent, for instance undertakings by the nuclear-weapon States to respect the nuclear-weapon-free status of the region, negative security assurances, and zonal machinery as an additional assurance against proliferation.

Moreover, there is the possibility, however remote, that the NPT might be terminated some time after 1995 or that South Africa, having acceded to the NPT, might later decide to withdraw from it. Unless South Africa's renunciation of nuclear weapons were underwritten by a permanent zonal treaty, the demise of the NPT or South Africa's withdrawal from it would once again leave South Africa free to develop a nuclear-weapon capability (in theory, at least, the same would apply to all other African States parties to the NPT). This is one of the reasons why this article recommends that the Treaty should be permanent and that the clause permitting withdrawal should be as restrictive as possible.

A Broader Vision

An African nuclear-weapon-free zone could be a vehicle for furthering co-operation in the civilian uses of nuclear energy on the continent. There are countless applications of nuclear techniques in industry, agriculture, biological research and hydrology which IAEA is helping to introduce into Africa. This process could be accelerated by drawing on the resources of a reformed and acceptable South Africa.

I have mentioned the possibility of linking an African nuclear-weapon-free zone southwards to the continent covered by the Antarctic Treaty and westwards across the South Atlantic to the eventual limits of the Latin American zone. When the Treaty of Tlatelolco is fully in force (and recent actions by Argentina and Brazil may bring that day nearer), the South Pacific, Latin America and Antarctica and their surrounding seas will be joined together in one vast zone with which Africa and its oceans could be united.

There is thus the prospect that, before the end of this century, most of the Southern hemisphere would form a great nuclear-weapon-free zone that would stretch from the coast of western Australia across that continent, the South Pacific, South and Central America, the South Atlantic, Africa and across the Indian Ocean to the island of Mauritius. Only the northern reaches of the Indian Ocean would remain uncovered. On the oceans, the significance of the zone might be chiefly symbolic but on land it might move northward to encompass first the zone now contemplated by the States of South-East Asia.

Notes

- 1 General Assembly resolution 3472 B (XXX) of 11 December 1975.
- 2 Algeria, Egypt, the Libyan Arab Jamahiriya and Zaire each have a small research reactor, under IAEA safeguards. (Ghana and Nigeria abandoned earlier plans to acquire research reactors.)

South Africa operates an unsafeguarded plant for fabricating nuclear fuel, an unsafeguarded plant for producing uranium hexafluoride, two unsafeguarded plants for enriching uranium (one has been closed down) and, under safeguards, a large research reactor and two power reactors. Namibia, Gabon, the Niger and South Africa have large uranium mining operations and plants for processing uranium ore. IAEA does not apply safeguards to these types of plant.

3 This should not present a problem. Spain is a non-nuclear-weapon State party to the NPT and hence is barred from acquiring or testing nuclear weapons.

4 If the zone were to include La Réunion, an overseas department of France, France might have a formal difficulty in applying the nuclear-weapon-free statute to the island.

5 "Establishment of a nuclear-weapon-free zone in the region of the Middle East" (United Nations document A/45/435 of 10 October 1991), pp. 20-21. The members of the Arab Maghreb Union are Algeria, the Libyan Arab Jamahiriya, Mauritania, Morocco and Tunisia.

6 Since South Africa is today the only potential nuclear-weapon State in Africa, the General Assembly's requirement of a total absence of nuclear weapons can be fully met only if South Africa is a party to the zonal treaty.

7 Article 4, paragraph 2, and article 28, paragraph 1 of the Treaty of Tlatelolco.

8 Under international law the nuclear-weapon States already possess the right of innocent passage through territorial waters as well as through international straits (Gibraltar) and waterways (the Suez Canal). The United Nations study on a nuclear-weapon-free zone in the Middle East concluded that the extension of the zone beyond the limits of national jurisdiction "... should be left to the later stages of negotiations" (United Nations document A/45/435, paras. 53-55 and 75).

9 If extended over the southern Indian Ocean as well, it would encompass French, as well as British and possibly Norwegian possessions such as La Réunion and Crozet Island (French), St. Helena, Ascension Island, Tristan da Cunha and Gough Island (British), and Bouvet Island (Norwegian).

10 If the treaty were to enter into force for each eligible State as soon as it ratified it, there would be the risk that the prohibitions contained in the treaty would apply to most of the eligible States but not the crucial one, South Africa. (In Latin America, 23 States have brought the Treaty of Tlatelolco into force but not, so far, the two "threshold" States, Argentina and Brazil.)

- 11 This would have the advantage of bringing within the scope of the treaty a wide stretch of ocean between South Africa and its southerly possession, Prince Edward Island, a region that has reportedly been used as a missile range. The island itself would already have come within the scope of the treaty by reason of South Africa's own ratification.
- 12 In fact, only the United States and the USSR have ever carried out "nuclear explosions for peaceful purposes". The United States gave up its programme many years ago and the Soviet Union has recently followed suit.
- 13 No matter what conditions are set in a treaty, it is, of course, impossible to prevent a State from withdrawing if it is determined to do so. All that can be done is to make the price of withdrawal as high as possible.
- 14 That is, safeguards on all the nuclear activities of the importing State such as those applied in non-nuclear-weapon States parties to the NPT.
- 15 Such inspections are also foreseen in certain drafts of the chemical weapons Convention. (See *The Projected Chemical Weapons Convention*, prepared for UNIDIR by Thomas Bernauer (United Nations publication, Sales No. G.V.E.90.0.3, 1990), p. 213).
- 16 IAEA may make a special inspection if, for instance, a significant loss of nuclear material has been reported or if it considers that the information it is getting from the State is inadequate.
- 17 That is, invoke the sanctions set forth in article XII.C of the statute of IAEA. The principal sanction would be the actions prompted by an IAEA report to its members, to the Security Council and to the General Assembly of the United Nations.
- 18 A full-scope safeguards agreement between South Africa and IAEA would be a significant step but would not constitute a formal renunciation of nuclear weapons such as that prescribed in article II of the NPT. Other African States might of course set additional conditions for holding a conference in which South Africa would be invited to participate, for example, the formation of a government representative of all its peoples. However, these issues are beyond the scope of this article.

Appendix

Certain obligations of States parties,
of the nuclear-weapon States
and of other extraregional States
under the NPT, the Treaty of Tlatelolco
and the Treaty of Rarotonga

The NPT

- prohibits
 - nuclear weapons and other nuclear explosive devices in non-nuclear-weapon States (NNWS) party to it;
 - (implicitly) testing of nuclear weapons in NNWS (except “nuclear explosions for peaceful purposes” carried out on the territory of an NNWS by a nuclear-weapon State (NWS);
 - exports to NNWS for peaceful purposes unless under IAEA safeguards (safeguards on an exported item and its products only);
- requires
 - IAEA safeguards on all peaceful nuclear activities in NNWS party to it;
- permits
 - deployment of nuclear weapons by NWS on territories of NNWS (e.g. United States nuclear weapons in Germany and in other NATO NNWS);
 - military non-explosive uses of nuclear energy (e.g. nuclear submarines);
 - unsafeguarded nuclear exports to NWS;
 - unsafeguarded nuclear activities in non-NPT NNWS (e.g. Indian power reactors, South African enrichment plant);
 - dumping of nuclear waste at sea;
- omits
 - “negative security assurances” by NWS to NNWS, i.e. assurances by the NWS that they will not use or threaten to use nuclear weapons against the NNWS parties to the treaty.

The following are some additional non-proliferation requirements set by the Treaty of Tlatelolco and the Treaty of Rarotonga.

They

- prohibit
 - deployment of nuclear weapons on territories of parties (Treaty of Tlatelolco and Treaty of Rarotonga);

- deployment of nuclear weapons on adjacent oceans (Treaty of Tlatelolco only although the Treaty of Tlatelolco may permit—or cannot stop—the innocent passage of nuclear-armed warships);
- testing of nuclear weapons anywhere in the zone (Treaty of Tlatelolco implicitly and Treaty of Rarotonga explicitly);
- nuclear exports to any NWS except under IAEA safeguards (Treaty of Rarotonga only);
- nuclear exports to any NNWS except under full-scope safeguards (Treaty of Rarotonga only);
- dumping of nuclear waste in adjacent oceans (Treaty of Rarotonga only);
- non-explosive military uses of nuclear energy (Treaty of Tlatelolco only, though this may be disputed by some parties);
- require
- negative security assurances by NWS to NNWS;
- application of the Treaty by extraregional States in the territories they control;
- permit
- (in the case of the Treaty of Tlatelolco only) nuclear explosions for peaceful purposes with devices constructed by the parties (though it should be noted that this interpretation is challenged by some parties and by most of the NWS and seems to be nullified by the recent renunciation by Argentina and Brazil of nuclear explosions for any purpose).

Other provisions

Regional Supervisory Authority: Both the Treaty of Tlatelolco and the Treaty of Rarotonga provide for a regional authority to supervise the implementation of the Treaty. The Treaty of Tlatelolco provides for a regional inspection corps, operating under the regional authority, which would carry out “challenge” inspections at the request of any Party. The Treaty of Rarotonga makes provision for a treaty inspection team to investigate complaints.

Sanctions: Only the Treaty of Tlatelolco provides explicitly for sanctions in the case of a violation. These are, however, similar to the sanctions foreseen in the statute of IAEA for the breach of a safeguards agreement and include notification of the breach to the General Assembly and the Security Council. The NPT and the Treaty of Rarotonga rely indirectly on IAEA sanctions if there should be a diversion of nuclear material to the manufacture of a nuclear explosive.

Duration: The Treaties of Tlatelolco and Rarotonga are permanent treaties. In 1995 a conference of its parties will decide how long IAEA safeguards will be extended.

Withdrawal: A party may withdraw from the NPT if it decides that "extraordinary events, related to the subject matter of this Treaty, have jeopardized [its] supreme interests". The Treaty of Tlatelolco contains a similar provision but provides an additional ground of "circumstances" that affect "the peace and security" of one or more of its parties. The Treaty of Rarotonga is the most specific: parties may withdraw in the event of a violation by any party of an essential provision of the Treaty. No party has withdrawn from any of the treaties.

Objects prohibited other than nuclear explosives: None of the treaties seeks to prohibit or regulate the acquisition of nuclear weapons systems (e.g. missiles) other than the explosive charge.

Civilian uses of nuclear energy: The NPT and the Treaty of Tlatelolco require that the development of the civilian uses of nuclear energy should not be impeded.

Physical protection of nuclear plant and material: None of the treaties require their parties to apply the Vienna Convention on the Physical Protection of Nuclear Material or other such measures (to prevent terrorist or other criminal misuse or destruction).

Confidence- and Security-building Measures: Their Applicability in the Asia-Pacific Region

South-East Asian Security Issues and Confidence-building

Kusuma Snitwongse

Security Issues

Security issues in the South-East Asian subregion are both diverse and complex, involving as they do some issues that are bilateral and some that are multilateral as well as some that relate both to States of the region and to external actors. For purposes of analysis, the security issues relevant to South-East Asia will be dealt with at three levels, although each is not exclusive of the others.

Great-Power Linkages

One level of concern in South-East Asia has been the linkages with the great Powers or their penetration into the security problems of the region. In the bipolar world, the super-Power competition at the global level was projected

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onto the region. Whether for the Viet Nam war or the Cambodian conflict, South-East Asia provided the arena for the great Powers' conflict and competition.

Of late, there have been changes in great-Power relations, characterized by a shift away from confrontation to co-operation, marked by the Sino-Soviet normalization of relations in April 1989; the Conference on Security and Co-operation in Europe (CSCE) held in Paris in November 1990; and, particularly, of direct relevance to South-East Asia, the agreement by the permanent members of the United Nations Security Council on the framework for a settlement of the Cambodian conflict.

Catalysed to no small extent by economic imperatives, the improvement in great-Power relations has been accompanied by the drawing down of the military presence of the two super-Powers. The Soviet Union has unilaterally removed most of its offensive aircraft and naval vessels from Cam Rahn Bay, in line with its new strategic doctrine, which emphasizes a defensive posture. While the United States has announced its intention to remain a major Pacific Power, a reduction of its forces in the area appears inevitable. The prognosis for a United States base in the Philippines is one of phasing out over a period of from five to ten years, and the recent agreement with Singapore would suggest that the future structure of a United States military presence in the region will be in the nature of a diversified and limited use of facilities.

Diplomatically, there have been improvements in relations between the great Powers and the regional States across old adversarial boundaries. Most dramatic has been China's normalization of relations with Indonesia, which will lead to China's having diplomatic relations with all members of the Association of South-East Asian Nations (ASEAN). China's relations with Laos have been on the upswing. The Soviet Union has been pursuing a policy of

"constructive engagement" with countries members of ASEAN, the success of which can be gauged by the numerous exchanges of visits by high-ranking officials of both sides. There has been a tentative improvement of relations between China and Viet Nam and between the United States and Viet Nam.

To all intents and purposes, at the super-Power level, the security environment has become more benign and a further diminution of their penetration into the region's security problems can be expected.

Actors in the Region

Despite the waning of bipolarity, it is expected that South-East Asia will see a greater number of actors in the region, with uncertain security implications. Of the utmost concern for South-East Asian countries is China, whose land and sea frontiers border on the region. China is, without a doubt, part of the South-East Asian "security complex" by reason of its close involvement in the Cambodian conflict through support of the resistance, particularly the Khmer Rouge; its border conflict with Viet Nam; and its extensive claim in the South China Sea, which overlaps with the waters of many South-East Asian countries. With its evident readiness to enforce its claim by force and its formidable military capabilities in local offensive operations, as in the case of the Spratlys,¹ a result of its navy's growing blue water capability, China looms large in the threat perceptions of regional countries. While it can be expected that China will be more militarily assertive in the South China Sea in view of its growing capability, this could be constrained in the short and medium term by its preoccupation with domestic problems and its concern with improving international political and economic relations, including those with ASEAN countries.

Another major actor of note in South-East Asia is Japan, whose predominance in the economic realm is accompanied by a greater readiness to play a political role commensurate with its economic status. With regard to South-East Asia, Japan has evinced a readiness to play a constructive role in the resolution of the Cambodian conflict, which included an offer to help finance peace keeping and the hosting of a meeting among the Khmer factions in Tokyo in 1990, moves that were generally welcomed in South-East Asia. However, the possibility that Japanese may play a military role in the region is proving to be of concern to most countries in the region as was evident in the negative reaction to the Thai Prime Minister's reported—but later denied—invitation to Japan early in 1990 to hold a joint naval exercise with Thailand. The major concern in South-East Asia is not so much Japan's growing military capability as the possibility that Japan might take an independent military role outside of the United States-Japanese security arrangement. Reasons for this concern arise from the growing tensions in United States-Japanese relations and the widening debate in Japan regarding the validity of the United States-Japanese Security Pact. This concern is, however, of a longer-term nature, discounting the possibility of a precipitous withdrawal of the United States forward deployment from the region, which appears unlikely.

India is another actor which is beginning to figure in South-East Asia's security consciousness. With the significant advances made by the Indian navy in the 1980s, and the possibility of India's strategic domain eventually extending to South-East Asia, as suggested by some Indian defence analysts,² some South-East Asians are beginning to see India as possibly coming within the region's "security complex". This is supplemented by the continuing Sino-Indian conflict and competition. The growing Chinese capa-

bility for the projection of its naval power³ into the Indian Ocean, as suggested by the 1985 South Asia expedition by Chinese warships, and the recent reported Chinese-Myanmar arms deal,⁴ provide grounds for speculation over a possible spill-over of the Sino-India competition and conflict into South-East Asia.

At the domestic level, South-East Asian countries are concerned with threats to their internal stability. At a minimum, governments are concerned that their people should be provided with such economic and social welfare as will continue to provide legitimacy for the government. This task is, however, proving to be difficult despite the successes in some countries in producing high growth rates. With few exceptions, there is a trade-off between growth and equity, threatening stability with unmet rising expectations. Another economic problem is that of maintaining sustained growth when national economies are integrated into the world economy and subjected to the vagaries of the latter. Yet another challenge to the sustaining of economic growth has to do with the depletion of natural resources within a country's own borders. This concern is having an effect on relations among States in the region as each becomes more determined to guard its own resources.

Apart from the problem of its shortcomings in economic performance, a government's legitimacy may be determined by ethnic, religious or ideological differences, which may work in combination with economic grievances or be exclusive of them. Most South-East Asian countries are faced with these problems to different degrees, from simmering tension within the society to outright armed rebellion.

Intra-Regional

The third level of security issues is intra-regional, although external actors are also involved directly or indi-

rectly in a number of issues. The most prominent has to do with disputes over boundaries, both land and sea, which have resulted in armed confrontations and conflicts.

Disputes over land borders exist between Thailand and Cambodia, Thailand and Laos, Viet Nam and Cambodia. The last two disputes have caused armed clashes in the recent past.

More extensive disputes have to do with maritime boundaries. The "new ocean régime", resulting from the Conference on the Law of the Sea, has extended coastal State control over the continental shelf and a 200-mile exclusive economic zone, with a greatly increased incentive for States to establish their sovereignty over islands. Of the 15 possible maritime boundaries in the South China Sea, excluding the Gulf of Thailand, 12 are in dispute. The disputes involve China with Brunei, Malaysia, Indonesia, the Philippines and Viet Nam; and Viet Nam with China, Indonesia, Malaysia and the Philippines. Disputes also exist among ASEAN members, with Malaysia having disputes with all other members. Thailand has disputes also with Cambodia and Viet Nam in the Gulf of Thailand.

However, the dispute that has the greatest potential for armed conflict revolves around the conflicting claims over the Spratly Islands, which include China, Taiwan province of China, Viet Nam, Malaysia and the Philippines, all of which occupy a number of islands. Following the violent eruption of conflict between Chinese and Vietnamese troops in March 1988, disputants appear more ready to protect their claims against future intrusion. For domestic reasons already mentioned, nations are more determined than ever to guard their off-shore resources, which include hydrocarbon, minerals and fisheries. Apart from their existing and potential resources, the Spratlys in particular are also of strategic importance to external Powers, including the United States, Japan and the Soviet

Union, as regards the safety of sea-lines of communication. Recently, Chinese Prime Minister Li Peng expressed readiness to joint efforts with South-East Asian countries to develop the Spratly Islands, while putting aside for the time being the question of sovereignty.⁵ However, Viet Nam, which is the main contestant, will not be included until relations with China are normalized. This would leave an important gap in conflict management on the Spratlys.

While off-shore resources and the conflict that they entail may be most threatening to the region's security, other resource-related issues with potential for conflict, namely the use of the Mekong River and the exploitation of timber on mainland South-East Asia, should also be taken into consideration.

A potential for intra-regional conflict related to economic issues could arise from the emerging economic interdependence between the more advanced economies and less developed economies in the region. Conflict could arise if there was an unacceptable inequity in the relationship.

Another security issue at the intra-regional level has to do with external support or intervention in armed rebellions in regional countries for ethnic, religious or ideological reasons. Problems with their Muslim minorities in Thailand and the Philippines have caused concern regarding assistance from their kith and kin in neighbouring countries, particularly Malaysia. Laos and Viet Nam have complained about resistance movements allegedly launched from Thailand. Should the Cambodian conflict be settled in such a way that the Khmer Rouge continue to carry on an armed struggle against the Phnom Penh régime, problems could arise between Thailand and neighbouring Cambodia.

Much concern has been expressed about the growth in arms procurement in ASEAN countries as a sign of a

possible arms race, entailing greater tension and instability in the region.⁶ A question that is often raised is why there is this growth while the region's security environment is becoming more benign with the drawing down of the super-Powers' military presence and the Vietnamese troop withdrawal from Cambodia. A number of explanations may be given. The first is that of threat perception. The evolving and thus uncertain strategic scenario appears potentially troublesome, with more actors and a lack of clearly defined security threats as well as the felt need to compensate for the perceived drawing down of the United States presence. It is to be noted that the present trend in arms build-up in South-East Asia is characterized by a shift from a doctrine of counter-insurgency to one of conventional warfare. The original impetus to this shift was Viet Nam's invasion of Cambodia. A more recent one is the threat perception in the South China Sea. Because of the focus on maritime defence needs, most ASEAN countries are in the process of upgrading, in particular, their naval and air capabilities. The past positive correlation between the defence spending and the economic health of the country also helps to explain the upward trend in defence expenditure. Defence spending is following an upward trend also because the existing arsenal of the ASEAN countries is aging and rapidly approaching obsolescence. Further impetus is provided by the existing state of the arms market, which belongs to the buyers owing to a number of factors. It is possible for buyers to diversify their sources of arms supply, to demand easy-payment terms, off-set manufacturing contracts, licensed production of equipment and greater access to technology through co-production and co-development of military hardware.⁷ In the case of Thailand, the domestic power equation proves to be an important determinant in the acquisition of arms.

When discussing security issues at the intra-regional level, the existing suspicions that nations hold with regard to one another, derived from historical experience, of the distant or the recent past, will continue to figure in relations among them and shape their security perspective. Thailand's suspicion of Viet Nam's long-term intentions and Singapore's experience with separation from Malaysia are some of the cases that readily come to mind.

Towards a More Peaceful South-East Asia: Some Policy Options

ZOPFAN and SEANWFZ

The drawing-down of the two super-Powers' military presence from the region and the expected diminution of their linkages in the region's security problems can be seen as contributing to the realization of a zone of peace, freedom and neutrality (ZOPFAN). However, if we were to look at its origin and the reasons why it has remained basically a goal to be achieved since it was declared in 1971, an answer might be found to the question of its feasibility at present. Originally, when ASEAN was founded, the security of its members was to be attained by the establishment of a regional order in which conflicts among member countries were to be confined and positive co-operation encouraged. In view of its limited resources, protection from external threat was to be provided by the United States. The prospect of the United States moving out of South-East Asia led to the idea of ZOPFAN, which would replace the protection from an external Power by the management of the regional order by the regional States themselves. Underpinning ZOPFAN would be political stability and internal security or national resilience, in Indonesian parlance, which would, in turn, bring about

regional resilience by pre-empting external Powers from intervening in domestic or regional affairs.

ZOPFAN's strategy for peace and security through detachment and self-reliance foundered on the reluctance of some members to dispense with external guarantees, and the goal of removing foreign bases was agreed upon without a time-limit being set. The prerequisite of a favourable constellation of external Powers was also lacking.⁸ Viet Nam's invasion of Cambodia in December 1978 soon reflected that Power constellation when South-East Asia became clearly polarized.

The present evolving security environment, both at the super-Power level and at the intra-regional level, the latter with the prospect of resolution of the Cambodian conflict and improving relations between ASEAN and the Indochinese countries, appears to fit into the scheme of ZOPFAN. However, judging by the lack of objection by other ASEAN members to Singapore's agreement with the United States in November 1990 providing the latter's warships and planes with greater access of its facilities, at least once they were assured that no permanent basing was involved, indicates the view that the United States presence is benign and stabilizing at the present time of an uncertain and evolving pattern of power.

While ZOPFAN lies in abeyance, an attempt has been made to put a South-East Asian nuclear-weapon-free zone (SEANWFZ) into operation. Again, while the United States presence is still seen as beneficial, implementing SEANWFZ will be problematic as the United States has made clear its objection to the plan.

Nevertheless, the idea of SEANWFZ was first introduced as a stopgap measure for the suspended ZOPFAN. It was to provide a forum at which all South-East Asian countries, then polarized by the Cambodian conflict, could have positive interaction. Assuming that the Cambodian

conflict will be resolved in the foreseeable future, consultation on SEANWFZ could provide one venue for integration of Indo-China and Myanmar into a unified South-East Asia. Taking into consideration the United States objection, a piecemeal approach to establishing a nuclear-weapon-free zone (NWFZ) could be chosen over a comprehensive one, which means an agreement in a full-fledged legal instrument that would form the foundation of the denuclearization of the region concerned.⁹ In a piecemeal approach, members could start from one of the three essential elements in a NWFZ, namely non-possession. (The other characteristics are non-deployment and non-use of nuclear weapons.) Non-possession is in line with non-proliferation. This should be easily acceptable, as all except Myanmar and Brunei are signatories of the 1968 Treaty on the Non-Proliferation of Nuclear Weapons. Non-use would follow naturally, leaving non-deployment untouched for the time being. However, judging from the United States position on the NWFZ in the South Pacific, it is even doubtful whether the piecemeal approach would be acceptable to Washington. None the less, ZOPFAN and SEANWFZ remain on the ASEAN agenda and, at the least, they are useful as guides to the enhancement of regional peace and security over the longer term.

Enhancing and Broadening the ASEAN Process

If confidence-building is defined in a broad sense to mean any measure that builds confidence, then ASEAN has, for a long time, been a confidence-building régime. The formation of ASEAN itself came about with the common realization that confrontation and conflicts that existed among the countries in the region in the past were counter-productive and that security could best be guaranteed by the establishment of a regional order which promoted conflict avoidance and positive co-operation. In a

concrete form, the Treaty of Amity and Cooperation in South-East Asia and the Declaration of ASEAN Concord of 1976 laid down the rules of conduct for members by which they would refrain from threatening one another and would settle their disagreements peacefully and without outside interference. ASEAN can be described as a "security community" in the sense that these rules of conduct have come to be accepted by members. The practice of consultation and consensus-building has reinforced the process of conflict avoidance. Co-operative efforts in political, economic, social and cultural fields also help build a sense of community. All these add up to confidence-building in a comprehensive sense, apart from the politico-military situation.

However, questions have begun to be raised whether ASEAN's success at confidence-building that has underpinned the "security community" is chimerical. After all, it has been pointed out that conflicts among the member countries have not been solved. The ASEAN cohesiveness has been the result of the Cambodian conflict, the resolution of which appears closer than ever. Moreover, arms procurement by ASEAN countries is, in fact, creating tension and undermining whatever confidence may have been built over the years. Existing conflicts could worsen, as in the case of conflicts over natural resources, while new sources of conflict are emerging, including, for example, the problem of migrant labourers. For these reasons, the ASEAN process of community-building should be enhanced. The necessary measures could include:

- 1 Intensification of formal and informal consultations, both official and private, backed by improved mechanisms for decision-making and co-operation. This should include the institutionalization of the ASEAN Summit, which serves not only as a symbol of ASEAN unity but as a forum

that promotes better understanding and empathy for each other's interests and concerns. It could serve also to discourage unilateralism, which appears to be on the rise, and is detrimental to the established norms of consensus and consultation;

2 Institutionalization of procedures of conciliation to replace the existing practice of *ad hoc* self-restraint between members as the potential for greater conflicts begins to emerge;

3 Greater integration of the members' armed forces. While a number of practices exist on a bilateral basis that count as military confidence-building measures, such as exchanges of visits of military personnel and students at staff colleges, exchanges of intelligence, and joint exercises, more could be done in the way of moving towards such integration, for example through consultation on military doctrine, standardization of arms, and co-operation in providing services and maintenance.

Peace in South-East Asia should be seen as indivisible, and efforts should be made towards integrating the hitherto divided region. The following measures could be taken:

1 Endorsement of the 1976 Treaty of Amity and Co-operation in Southeast Asia by the non-ASEAN members as a first step towards a new intergovernmental mechanism for region-wide conflict resolution and co-operation;

2 Denial of support to foreign resistance forces in one's territory, with possible measures for verification;

3 The introduction of military confidence-building measures, particularly between Thailand and Viet Nam, Thailand and Laos, Thailand and Cambodia, and Viet Nam and Cambodia. In the case of Thailand and Viet Nam, although the two countries do not have common borders, long-held distrust exists because of geostrategic and histor-

ical factors. A number of confidence-building measures could be envisaged, including exchanges of visits of military personnel, discussions of military doctrines, visits to military installations, and invitations to observe military exercises. Confidence-building measures for Thailand-Laos, Thailand-Cambodia and Viet Nam-Cambodia could include, besides those mentioned above, advanced notification of military manoeuvres within a certain distance from their common borders as well as invitations to observe the manoeuvres;

4 Settlement of border disputes and, pending the settlement, measures to prevent armed clashes, such as the withdrawal of troops from the disputed areas;

5 Promotion of co-operative efforts such as development of the Mekong River Basin;

6 Co-operation among the more developed ASEAN countries in providing aid and technical assistance to the Indo-Chinese countries and Myanmar. In particular, special efforts should be made for the reconstruction and rehabilitation of Cambodia to help strengthen the fabric of peace in that country;

7 Promotion of economic interaction in such a way as to ensure equitable benefits.

A Move Towards a Negotiated Settlement of Conflict in the South China Sea

As the South China Sea is a focus of multilateral conflict with a high potential for armed confrontation, efforts should be made towards the eventual solution of the conflict. However, considering the tension that has existed especially since the Sino-Vietnamese armed clash in March 1988, confidence-building measures are required and co-operative measures must be promoted to ensure an

atmosphere conducive to a negotiated settlement. These could include:

- 1 The freezing of all activities aimed at the occupation of additional islands in the Spratlys;
- 2 Renunciation of the use of force and agreement to settle disputes by peaceful means;
- 3 Follow-up on the Chinese proposal to set aside the issue of sovereignty, with the understanding that it is negotiable, in order to move towards negotiation on joint exploitation of resources by claimant States, bilaterally or multilaterally as the case may be;
- 4 Bearing in mind the strategic nature of the area as regards the safety of sea-lines of communication, the working out of co-operative measures with regard to surveillance and safety by the nations concerned, both regional and extra-regional.

A Sub-Regional CSCE-Style Conference

In view of the changing Power equations, together with the uncertainties and opportunities that they entail, a process of dialogue should be encouraged.

While an Asia-Pacific CSCE-style conference may not be feasible owing to the existing diversity of conflicts, a subregional conference on security and co-operation confined to South-East Asia may well be feasible. Such a conference could consist of the South-East Asian countries and the external Powers that are involved in the region and that are of concern to the States of the region. The external Powers could include the United States, the Soviet Union, China, Japan, India, Australia and New Zealand.

Notes

- 1 Ross Babbage, "Change in the North Pacific: Implications for Australia's Security", *Australian Outlook*, December 1989, vol. 43, No. 3, p. 10.

- 2 Cited by Tai Ming Cheung from an interview with defence analysts at the Institute for Defence Studies and Analysis, New Delhi, May 1989, in *Growth of Chinese Naval Power* (Singapore, Institute of Southeast Asian Studies, 1990), p. 11.
 - 3 For details see *Growth of Chinese Naval Power*, chap. II.
 - 4 *Far Eastern Economic Review*, 13 September 1990, p. 29; and *The Nation* (Bangkok), 27 November 1990, p. 1.
 - 5 *Far Eastern Economic Review*, 30 August 1990, p. 11.
 - 6 ASEAN defence spending is shown in the following table (in billions of US dollars at 1985 prices and exchange rates).
- | | <i>Singapore</i> | <i>Malaysia</i> | <i>Indonesia</i> | <i>Philippines</i> | <i>Thailand</i> |
|------|------------------|-----------------|------------------|--------------------|-----------------|
| 1985 | 1.188 | 1.764 | 2.341 | 0.474 | 1.517 |
| 1987 | 1.078 | 1.455 | 1.704 | 0.766 | 1.579 |
| 1988 | 1.184 | 1.641 | NA | 0.855 | 1.573 |
- Source: *Far Eastern Economic Review*, 30 August 1990, p. 30, from International Institute for Strategic Studies.
- 7 See Michael Richardson, "Growth market for defence equipment", *Pacific Defense Reporter*, May 1990, pp. 11-12.
 - 8 Soedjatmoko, "Regional Security Arrangements in the Third World", paper presented to a meeting of the Independent Commission on Disarmament and Security Issues, New Delhi, 17-19 January 1986.
 - 9 Jaako Kalela and Raimo Vayrynen, "Nuclear Weapons Free Zones: Past Experiences and New Perspectives", in Kari Mottola, ed., *Nuclear Weapons and Northern Europe* (Helsinki, Institute of International Affairs, 1983), pp. 70-71.

Confidence- and Security-building
Measures: Their Applicability
in the Asia-Pacific Region

Confidence-building Measures in the Asia-Pacific Region

Qin Huasun

As one of the largest countries in the Asia-Pacific region, China attaches great importance to maintaining and promoting peace, security and development in this region. It is therefore interested in the related issues of regional confidence-building measures (CBMs), security and disarmament.

I

In vast areas such as Asia and the Pacific, the regional confidence-building, security and disarmament issues cannot exist in isolation; on the contrary, they are closely linked to, and influenced by, what is happening globally or in other areas. If, in the global context, it is still necessary to contend with such things as the strong bullying the weak and the great harassing the small, the sovereignty of States being ignored and the arms race running wild, certainly world peace and security, including the Asian-Pacific countries and regions, will be under threat; and as a result, neither CBMs nor security and disarmament ar-

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rangements for the Asia-Pacific area can make any real progress.

In recent years, the most fundamental changes since the Second World War have been occurring in the international arena, with the old world order breaking up and the new order not yet taking definite form. Characterized by a reduction in the East-West military confrontation and by the promising prospect of the achievement of a political solution to some regional conflicts, the overall international atmosphere today has improved to some degree.

On the other hand, it is also undeniable that the world still suffers from a number of factors that constitute a threat to peace and security: the practices of hegemony and power politics have yet to be eliminated. In certain areas, political, economic or national disputes tend to deepen and worsen, leading to new tension and turbulence. Several regional conflicts, including the conflict in the Middle East, have a long way to go and have many difficulties to overcome before achieving just and reasonable political solutions. In the field of disarmament, the momentum of the global arms race, though somewhat abating, has not come to an end. Worse still, in some cases, it is claimed that weapons have been reduced, while in fact they have been transferred to other areas, thus causing new threats to peace and security. The proceedings of the multilateral disarmament efforts remain unsatisfactory, partly at least because of those attempts to shift the responsibility for disarmament and change the terms of certain disarmament objectives. There is a recession in the world economy and in international trade. Consequently, the economic situation in the developing countries is becoming increasingly bleak, and, at the same time, the disparity between the developing countries and the developed world is further deepening, and the North-South polarization is worsening.

Not only are these serious factors affecting world peace and security, but they also serve to confine and curb the emergence and development of regional CBMs and security and disarmament measures. In this regard, the Asia-Pacific region is no exception.

II

Solutions to issues in Asia and the Pacific can be found only in regard to the specific situation and characteristics of the region. This is true also in regard to the arrangements for CBMs, security and disarmament.

An idea has surfaced recently that the Conference on Security and Co-operation in Europe (CSCE) model for confidence- and security-building measures and the Negotiation on Conventional Armed Forces in Europe (CFE) model for European disarmament are panaceas that other parts of the world should prescribe for their own problems. I do not think this will work.

Positive though it may be, the progress in Europe was achieved under the particular circumstances prevailing in Europe. Experience gained in Europe can hardly apply to other regions, where the situation and conditions differ from those of Europe. Differences exist at least in the following aspects. First, for many years, Europe was dominated by two clearly delineated blocs that confronted each other both politically and militarily. No such blocs exist among the several dozens of countries in Asia and the Pacific. Secondly, the Asia-Pacific region also differs from Europe in that in this region, and, indeed, in every subregion, there are many unique conflicts and problems that are diverse in source and nature. Thirdly, while countries in Europe may be at different levels of development, they are all, on the whole, developed countries, while in Asia and the Pacific there are developed countries, developing countries and even the least developed countries. Fourthly,

the political, social and cultural diversity among the Asian and Pacific countries is also much greater than that in Europe. In view of these major differences, there is no possibility of mechanically applying the European experience and model to this region.

Different regions can only find and adopt appropriate measures to solve their problems in the light of their own specific circumstances. This is a basic principle, a principle that must be followed in exploring arrangements for CBMs, security and disarmament in Asia and the Pacific.

III

Against this backdrop, what approach should we take in our search for CBMs, security and disarmament? Given the situation in our region, the following general approach appears to be reasonable and practicable:

1 In terms of geographical scope, bilateral arrangements should be given priority, followed by multilateral arrangements in small regions, which can then be gradually expanded to encompass larger areas (if needed).

2 As regards the measures to be taken, CBMs should take precedence, and these should be developed into security arrangements and arrangements for disarmament at a later stage.

3 With regard to the nature of the contacts and meetings between different countries, emphasis should first be laid on scholarly discussions and low-level official contacts, which will prepare the ground for high-level meetings.

4 In terms of time, the institution of the CBMs and security mechanisms should be viewed as a continuous process of gradual evolution, which needs time and patience. Otherwise, we may find ourselves in a situation best described by the proverb "All haste and no speed".

Of course, this is only a generalization, which does not preclude the adoption of other methods and the occurrence of exceptional cases, so long as the objective conditions and needs exist. However, from the perspective of the overall process and of the steps to be taken, I think that the above-mentioned approach is more logical.

IV

In line with this general approach, it is appropriate first to explore realistic and practicable CBMs. Broadly speaking, CBMs can be divided into two categories, military and non-military, which are complementary and promote each other. Given the situation in Asia and the Pacific, it would seem that the first step should be taken in the non-military field. This will prepare the ground and lay the foundation for the establishment of CBMs in the military field.

With respect to non-military CBMs, the following are among those undoubtedly applicable to the Asia-Pacific region:

- 1 Political and diplomatic relations between countries should be established and developed on the basis of the principles of mutual respect for sovereignty and territorial integrity, mutual non-aggression, non-interference in the internal affairs of other countries, and peaceful coexistence.

- 2 Economic relations between countries should be established and developed on the basis of the principle of mutual benefit.

- 3 The search for fair and reasonable political solutions to the existing problems of the regional "hot spots" must be expedited.

- 4 An end must be put to aggression against and occupation of other countries, interference in the internal af-

fairs of other countries and all forms of external expansion and hegemony.

5 International disputes must be settled in a strictly peaceful manner, that is, through negotiation and consultation.

6 No country should seek to impose its social system and ideology upon other countries, much less to interfere in the internal affairs and violate the sovereignty of other countries under such pretexts.

7 The exchange of staff and the exchange of information in the political, economic, social and cultural fields should be promoted among all countries, especially among those countries whose relations with each other, for whatever reason, are tense.

With regard to military or paramilitary CBMs, the following appear to be relevant to the Asia and Pacific region:

1 Nuclear-weapon States should undertake not to use or threaten to use nuclear weapons against non-nuclear-weapon States.

2 In order to prevent the proliferation of nuclear weapons, the countries concerned may set up nuclear-weapon-free zones or zones of peace, whose status should be respected by nuclear-weapon States.

3 Military bases, troops and military equipment, especially nuclear weapons, that are set up or stationed on the territory of other countries must be dismantled or withdrawn; no country in the Asia and Pacific region should send military forces overseas.

4 Military equipment retired as a result of disarmament measures to other parts of the world should be destroyed. It should not be transferred to Asia and the Pacific, since such transfers will only constitute new factors of instability in this region.

5 Every country should exercise self-restraint in terms of armaments and military spending and should not seek to achieve a level of armaments higher than that required for its legitimate defensive needs. Every country should also take measures to make its military strategy and the structure of its armed forces strictly defensive in nature.

6 In regions where conditions are appropriate, the countries concerned can and should, through consultations on a voluntary basis, reach arrangements for the exchange and verification of military information and statistics, and for the declaration and mutual inspection of military manoeuvres.

These are only some major aspects described in very broad terms and do not exclude other CBMs.

It must be pointed out that the United States and the Soviet Union still maintain huge offensive armed forces in the Asia-Pacific region, including the army, the air force and blue-water fleets, posing a grave threat to other countries and exerting a negative influence on the political situation and security in this region. They should, first and foremost, take concrete measures to change this situation. In discussing the security of Asia and the Pacific, this ought to be a priority issue.

Certain views and suggestions have been put forward recently by some countries regarding the security of Asia and the Pacific. These ideas are still of a rather preliminary nature and have to be developed further and clarified. We would be willing to give positive consideration to all proposals and suggestions that are conducive to the improvement of security and the maintenance of peace in the Asia-Pacific region, and to make an assessment of all the related ideas advanced by any side in the light of the basic principles mentioned above. Generally speaking, it would not be feasible to establish an Asia-Pacific security mech-

anism on a large scale overnight. What should be done is rather to let things take their course and give the necessary impetus to this course as appropriate.

The more urgent tasks facing the Asia-Pacific region today are, for one thing, the solution of "hot spot" issues and bilateral disputes; and for another, the strengthening of economic co-operation. The countries concerned should first advance their dialogue and consultations with one another, and take practical measures to enhance trust, reduce tension, put an end to conflicts, and strengthen security. On this basis, they could gradually establish and develop regional security mechanisms, first in small areas, and then, gradually and as circumstances require, extend them to larger regions. This would be a suitable approach in the Asia-Pacific region. Of course, issues concerning the common interest of all the countries in this region should be solved through consultations among the countries on an equal basis. If most countries tend to favour a certain form of consultation, this would certainly deserve serious and positive consideration. I am confident that countries in the Asia-Pacific region can surely find a way to solve their problems that would be appropriate to the conditions prevailing in their region.

The Conventional Forces in Europe Treaty (*continued*)

Timely Decisions in the Field of Military and Strategic Security

Victor P. Starodubov

"All Members [of the United Nations] shall settle their international disputes by peaceful means in such a manner that international peace and security, and justice, are not endangered." (United Nations Charter, Article 2, paragraph 3)

From the time that the principle of the peaceful settlement of international disputes was first formulated in the Paris Treaty for the Renunciation of War of 1928 to its latest reaffirmation in the documents of the Meeting of Heads of State or Government of European countries held in Paris in November 1990, more than six decades have passed. However, this period of history cannot possibly be called peaceful. In the Second World War alone, more than 50 million people lost their lives.

It would have been expected that after such a shock the efforts of States would have been directed towards the exclusion of war from international relations, towards dis-

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armament. Unfortunately, that did not happen. A new stage of the arms race began, this time nuclear. As a result, humanity—as Mikhail S. Gorbachev put it—very quickly lost its immortality. The nuclear arsenals which have now been accumulated are sufficient to destroy many times over the civilization built up over thousands of years. Yet the process of developing, improving and deploying nuclear weapons all over the planet continues.

Since 1945 when the United States used nuclear weapons against the Japanese cities of Hiroshima and Nagasaki, nuclear weapons have not been used in war—but hardly anyone would venture to say that they will never be used. Such use could be touched off by some chance event, the unauthorized or provocative firing of a nuclear missile, a technical failure in the means of detection, or a conflict of the kind that recently occurred in the area of the Persian Gulf. It is also disturbing that the number of States which are openly or secretly joining the nuclear club is growing. The increasing threat of the use of weapons of mass destruction in the course of military conflicts also gives impetus to this process.

It must therefore be recognized, without detracting from the importance of declarations on the peaceful resolution of inter-State disputes, that in order actually to exclude war from international relations, something more than declarations is required. What is needed are practical steps. They may be unilateral or taken as a result of international agreements. However, while the usefulness of unilateral declarations is recognized, it must nevertheless be seen that without negotiations and the specific measures agreed to in them it is impossible to implement the principle of a violence-free world.

For Europe, the first tangible steps in this direction were clearly the Treaty between the USSR and the United States on the Elimination of Their Intermediate-Range

and Shorter-Range Missiles (INF Treaty) and the signing in Paris in November 1990 of the Treaty on Conventional Armed Forces in Europe (CFE). But, in spite of this major achievement, differences between the approaches of the two sides to the problem of disarmament became apparent in their assessment of these Treaties.

For example, in the INF Treaty the USSR agreed, as we know, to eliminate twice as many missiles and almost four times as many warheads as did the United States. In the Treaty on Conventional Armed Forces it also agreed to eliminate more weapons than any of the other States participating in the negotiations. In doing so, the USSR demonstrated that it firmly supported, not only in words but in deeds, the elimination of the physical basis for the threat hanging over the world and gave practical effect to the new political thinking it had proclaimed, at the root of which, so far as military security is concerned, is the idea of a non-violent, nuclear-free world.

The States members of the North Atlantic Treaty Organization (NATO), however, did not see (or chose not to see) in these Soviet decisions the elements of a new approach to the solution of international problems. Clinging to the stereotypes of the past, they characterized the Soviet Union's agreement to these steps as a "victory", a "triumph", and even the result of the "positions of strength" of the United States and NATO. This is disquieting—not solely because the assessment by the NATO countries is groundless. What is alarming is that the apparent emphasis laid on strength in international relations indicates that they have not yet fully grasped the dangers involved in the use of force as a method of solving international problems nor have they taken into account the developing world situation.

This conclusion is reinforced by NATO's attitude towards the events unfolding in Europe. It would be logical

to expect, for example, that in the wake of the voluntary dissolution of the Warsaw Treaty military organization, the NATO countries would likewise take steps in the same direction—but that has not happened. On the contrary, there have been declarations about the maintenance and even the extension of the bloc's functions. Nor are the NATO countries in any hurry to revise their military doctrine even to the extent of partial renunciation of the first use of nuclear weapons.

Consequently, in spite of the first steps taken in the field of disarmament and even in spite of the first unanimous Security Council decision, taken in the case of Iraq's aggression against Kuwait, the construction of a new, non-violent system of international security remains far distant.

Just as it is impossible to construct a building on the basis of two different designs, it is impossible to construct a new security system without agreeing on the basic principles of its construction. The aim of joint decisions should therefore be, not only declarations concerning the rules for mutual State relations, but practical steps leading to the elimination of the physical possibility of "blowing up the world".

The first and essential step towards creating the real conditions for a transition to a new system of international security must be a clear statement of the political will of States to renounce the use of force in international affairs. Further specific steps might then be taken along the lines suggested below.

—First, the opposing States and military alliances might agree to renounce attempts to maintain or achieve military superiority over the other side.

—Secondly, they might eliminate their available stocks of weapons of mass destruction. If it is impossible to agree on the complete elimination of nuclear weapons, it might be possible to proceed to their reduction to the lowest level

possible. (The opponents of the complete elimination of nuclear weapons consider their retention a guarantee against the possibility that one of the opposing sides might hide or secretly construct a number of nuclear weapons which might be small but would be enough to change the balance of power to its advantage. The retention of a small stock of nuclear weapons, they say, would make such actions pointless. Moreover, nuclear weapons could be used to neutralize the possibility of nuclear blackmail by terrorists.)

—Thirdly, the opposing States might decide jointly, by successive agreed reductions in armed forces and armaments, on a basis of military and strategic parity at every stage, to reduce them to minimum agreed levels sufficient only for defence.

—Fourthly, while reducing armed forces, the opposing States might give them a non-offensive structure.

—Fifthly, the opposing States could work out and put into effect a broad network of confidence-building and verification measures. At the same time, measures would be taken for both the exchange of information and the limitation of the military activities of States.

—Sixthly, inter-State disputes would be resolved by international arbitration, as provided for also in the United Nations Charter.

All the elements of the United Nations machinery responsible for the security of States would be strengthened and, if necessary, new machinery could be created in order to ensure its ability to neutralize any possible attempt by individual States to resort to the use of force in the settlement of inter-State problems. Such machinery could be established under the United Nations and at the regional level—for example, in Europe, side by side with the institutions of the Conference on Security and Co-operation in Europe (CSCE).

At the end of the process, States (and their allies) should be left with only such minimum armed forces as would enable them to retain adequate defensive capabilities while at the same time being unable to carry out large-scale offensive operations. These forces could be structured on the basis of three principles, which would seem in general to meet the needs of the armed forces of opposing States (and their allies) in a non-violent world: military and strategic parity; countering capacity (the renunciation of pre-emptive strikes); and reasonable defensive sufficiency.

The principle of military and strategic parity is traditionally regarded as the basis for strategic stability and international security. This principle is frequently taken to mean complete equality of military capacity between opposing sides. On that assumption, as has been rightly emphasized by many military and political analysts, the concern for parity becomes one of the factors contributing to arms races to the extent that the opposing sides assess their military capacities differently. As a rule, each of the sides, for various reasons, including inadequate information, somewhat overestimates the potential military capacity of the opposing side and organizes its own defences on the basis of that subjective evaluation. The other side judges such efforts as intended to gain a military advantage and takes corresponding measures, and so on. In order, therefore, to obviate such subjective perceptions of military parity and their concomitant stimulation of the arms race, it is reasonable to interpret military parity in a somewhat different way. That is possible to the extent that in present-day circumstances, and particularly given the existence of nuclear weapons, the spectrum of military and strategic parity covers a sufficiently wide range.

In actual fact, States adhering to the doctrine of defensive war and renouncing preventive military activities

have no need to interpret military parity as strict equality of all military capacities, offensive as well as defensive, of their armed forces with the armed forces of the opposing side (or sides). It is enough to maintain a balance of military strength enabling a country's armed forces to be confident that they can defend it but not providing them with the physical means to begin large-scale offensive actions for the purpose of aggressive war or to gain political advantage by military pressure on the other side.

This interpretation of military parity makes it possible to renounce symmetrical responses to the activities of the other side with respect to armaments, to reduce suspicion that the other side is seeking a military advantage, and to reduce the incentives to over-armament.

There is certainly also a need to work out criteria which would make possible an objective assessment of the military strengths of the two sides and enable each side to convince itself that the other did not in fact possess the material means to begin large-scale offensive operations.

Measures should also be agreed on to ensure the stability of military parity—which is the most important condition for strategic stability. Such measures would include limiting not only quantitative levels but also the qualitative improvement of weapons and inhibiting the opening of new channels for the arms race. A necessary first step in this direction is the prohibition of nuclear-weapon tests and the renunciation of the concept of making up for quantitative reductions by the qualitative improvement of the remaining weapons as is done, for example, under the “competitive strategy” of the United States and NATO.

The principle of counteractive capacity implies that States must refrain from preventive military action and pre-emptive strikes of any kind and, of course, from planning for aggressive war. In the words of the Chief of the

General Staff of the armed forces of the USSR, Mikhael A. Moiseev, at the Vienna Seminar on Military Doctrines held in January 1990, underlining this principle, a State should "never under any circumstances be the first to take military action against any other State, nor [should] it ever have recourse to such actions unless it is itself the victim of aggression, of an armed attack".

The principle of reasonable defensive sufficiency in the strict sense is hard to discuss without further clarification. Any non-aggressive State can rightly claim that nothing it does with regard to defence is above the level of reasonable sufficiency. Consequently, summarizing the statements made on this score by Soviet officials and filling in the gaps in their statements, the following initial definition might be proposed: "Reasonable defensive sufficiency is a function of whatever problem is under consideration."

The principle of reasonable sufficiency should meet the following criteria:

—Reasonable defensive sufficiency, whether with regard to conventional forces or to strategic nuclear weapons, cannot be a fixed quantity or the total of the quantities established for various kinds of armed forces and weapons. Obviously, it must be a function of the ever changing real dangers being faced (including those in existence during the disarmament process) as well as the other factors determining the strategic situation.

—This principle should ensure a defence which, while remaining within the limits of military and strategic parity, would clearly demonstrate to the opposing side the futility of any attempt to settle inter-State questions by force of arms.

—A defence constructed on the basis of reasonable sufficiency should not be excessive. While ensuring adequate deterrence, it should at the same time be limited to the minimum level, including the renunciation of preven-

tive military activities. The defence need not be overloaded with superfluous stocks of weapons and military technology.

—The military activity of such a defence, including its military presence on the territory of other States, would be essentially limited. Such a military presence would be permissible only when it was dictated by the need for a joint defence of the States on whose territory the presence was maintained and in accordance with jointly agreed-to obligations. The activity of fleets on world oceans would be reduced. Ultimately, their functions would be limited to maintaining communications and action as part of a United Nations force.

—A defence based on the principle of reasonable sufficiency should not be provocative, that is, it should not lead neighbouring or other States to strengthen their defensive forces. In order to increase confidence, the transformation of armed forces along these lines should be carried out in conditions of openness and transparency and under the appropriate international supervisory machinery.

—The level of reasonable sufficiency for defence would certainly be dependent on international agreements concerning the limitation and reduction of arms and military activities by the States parties to such agreements and on the near-term prospects for negotiations.

—Defence should—and this is very important—be as economical as possible, and should be constructed with due regard for material possibilities and human resources. It should not place too heavy a burden on a country's population.

These measures and principles governing armed forces are, for the moment, no more than proposals which might be utilized in the working out of agreements creating the international legal framework for a non-violent world. They could not, of course, be fully implemented before the

questions of security on a regional level, such as European security, for example, are resolved.

Nevertheless, a new non-violent European security system is not only possible but necessary. No matter how it is approached, in the final analysis its construction will require the political will of States, the renunciation of military advantage and the maintenance of the three principles referred to above for the constitution of armed forces participating in the military and strategic equilibrium.

As long as the NATO bloc continues to exist, it will of course define the military and strategic situation in Europe. But not only there, for the United States and Canada are also members of that organization, and they can certainly not be called European countries. On the other side, after the voluntary dissolution of the Warsaw Treaty Organization (WTO) as a military organization, the second party to the military balance in Europe in the present circumstances is the Soviet Union. Accordingly, everything that has been said about the new non-violent system of international security and its establishment on the regional level concerns NATO and the USSR, which for the time being constitute the opposing sides.

The Soviet Union has repeatedly expressed the wish to move from military confrontation towards European co-operation within "a common European home", and it has not only said this but has taken unilateral disarmament and other measures, and has taken bold decisions in the course of negotiations which in fact amounted to further acts of unilateral disarmament. The heads of the Western States constantly talk about their favourable attitude towards the idea of a peaceful Europe. It is impossible not to believe them, for who now considers war in Europe conceivable?

But if that is so, then it is necessary to negotiate on the basis of new approaches, abandoning the centuries-old argument about superior armed forces being the guarantee of security. Unfortunately, the old stereotypes seem to be very much alive. Examples are not far to seek. We need only refer to the negotiations on conventional armed forces in Europe.

The West's intention to secure military advantage for itself through the negotiations was already evident in their proposal for the negotiations. The objective laid down for those negotiations at the Vienna CFE meeting on 9 March 1989—"the establishment of a secure and stable balance of conventional forces at lower levels"—was replaced, at the West's desire, by a balance of land-based armed forces. Conventional naval forces, although they constitute an integral and important part of the military and strategic balance, were excluded from the negotiations. Thus, the as yet unborn agreement was already tipped in NATO's favour.

No special explanation is required for this. To the extent that NATO at present enjoys significant military superiority at sea, the reduction of land forces to equal levels will transform NATO's military superiority at sea into a general military superiority, which will be all the greater the more radical the land-based reductions are.

Consequently, the equalization of the military power of the two sides on land alone will in no way lead to strengthening the security and stability of the balance of conventional forces. On the contrary, it will lead to the unbalancing of the military potential of the two sides to NATO's advantage—and to the detriment of stability.

The argument that naval forces are not the kind of forces that lend themselves to "surprise attack" or in general to use for action in connection with military operations on land does not withstand scrutiny. One need only recall

the role played by naval forces in such land conflicts as in Korea (1950-1953), Viet Nam (1964-1973) and the recent events in the Persian Gulf area. In all these cases the naval forces of the United States played a direct role in the land theatre of operations.

It is clear that if NATO continues to ignore the concern of the USSR at the steadily increasing capacity of naval weapons to be employed as well as land forces and land-based aviation for strikes against land targets, including those located far in the rear, further progress in the limitation of armed forces and armaments may be slowed down or even halted entirely. The refusal to negotiate on the reduction of naval armaments must therefore be regarded as an attempt on the part of the United States and NATO either to guarantee their own military superiority or to frustrate the disarmament process. No third possibility exists. It is noteworthy also that the structure of the Agreement on Conventional Armed Forces in Europe does not reflect the current situation in Europe: NATO continues to exist and even to expand its functions, while the Warsaw Treaty Organization, as a military and political organization, has ceased to exist. Yet most of the articles of the Agreement were worked out when both alliances existed and the security of the USSR was ensured by the collective forces of all the WTO States. At present, in matters of defence, the Soviet Union can rely only on itself.

Should the Agreement be ratified, as seems likely, the real relationship of forces in Europe, that is, as between NATO and the USSR, will be as follows (to NATO's advantage):

Tanks and armoured combat vehicles 1.5:1

Artillery 1.3-1.5:1

Military aircraft and attack helicopters 1.3:1.

The conclusion is unavoidable: the follow-up negotiations on the strengthening of European security cannot

be conducted on a bloc basis. At the same time, the Charter of Paris provides that after the Helsinki meeting scheduled for 1992, negotiations will be conducted among all the 34 States participating in the CSCE process. Those negotiations should become the appropriate forum for the creation of a balance of military power between NATO and the USSR with a view to gradual movement towards a non-violent system of European security.

Two further comments should be made. No matter how perfect the limitation of conventional armed forces and armaments, as long as the two sides continue to possess nuclear weapons, basic security in Europe will be impossible. No equalization of conventional armed forces and armaments can compensate for a surprise nuclear attack. Therefore, while negotiations on conventional armed forces go on, it is necessary to begin parallel negotiations on the elimination or, at the least, the radical reduction of tactical nuclear weapons. Similar consequences might ensue if the qualitative aspect of weapons is left out of account. If the improvement of conventional weapons and the creation of new categories and types of such weapons is left entirely unregulated, that might radically undermine a formal quantitative balancing of armed forces, with all the ensuing negative consequences. From that point of view, the qualitative aspect of armaments should also be included in negotiations.

It is evident that, as a result of the decrease in international tensions in recent years, the threat of large-scale war, of a nuclear catastrophe, has somehow receded in people's minds, and has become a secondary concern. But wrongly so. The physical basis for war has not been materially reduced. Military development continues. Further improvements continue to be made in all kinds of weapons, including nuclear weapons.

The recent conflict in the Persian Gulf area made it possible to test new kinds and categories of weapons in battle and even gave a new impetus to some programmes which had been slowed down. For example, the successful use of the Patriot anti-missile missile has encouraged the Pentagon to continue work on the Strategic Defense Initiative (SDI). But this means that if a large-scale anti-missile defence system is developed, the first thing to go by the board will be the idea of reductions in strategic and therefore all other types of nuclear weapons. Whatever its sponsors say about this programme, it can only be assessed by the other side as an effort to obtain a shield ensuring the safety of the United States from retaliation against nuclear missile aggression and by that very token freeing its own hands to impose its will with impunity on any State in the world. It is possible that no such intentions with regard to the SDI programme exist in Washington. But they might arise should the opportunity present itself, and for that reason the other side is obliged to base its own actions, not on words, but on possible practical consequences.

The "efficiency" of cruise missiles has been proved. This once again underlines the need for the strictest limitation or, better still, the prohibition of such dangerous and provocative weapons (which could be armed with nuclear warheads). If before the events in the Persian Gulf some could still dismiss the role of naval armaments in land military operations, no doubt should remain in anyone's mind, after the battle testing of sea-based cruise missiles, carrier aircraft and even naval artillery against land targets, that their role is by no means that of least importance.

The world has witnessed a situation in the Persian Gulf area in which both sides were prepared for the use of weapons of mass destruction, and in consequence the likelihood of a world catastrophe is no longer so remote. All this is evidence that there is no reason for complacency as

yet. The problem of the elimination of the threat of war remains as acute as ever and its solution just as urgent.

Only awareness of this danger and the political will of States to eliminate it and to eliminate the physical capacity to "blow up the world" can bring about a stable and secure world.

Documentation Relating to Disarmament

Security Council Resolution 687 (1991)

3 April 1991

The Security Council,

Recalling its resolutions 660(1990) of 2 August 1990, 661 (1990) of 6 August 1990, 662 (1990) of 9 August 1990, 664 (1990) of 18 August 1990, 665 (1990) of 25 August 1990, 666 (1990) of 13 September 1990, 667 (1990) of 16 September 1990, 669 (1990) of 24 September 1990, 670 (1990) of 25 September 1990, 674 (1990) of 29 October 1990, 677 (1990) of 28 November 1990, 678 (1990) of 29 November 1990 and 686 (1991) of 2 March 1991,

Welcoming the restoration to Kuwait of its sovereignty, independence and territorial integrity and the return of its legitimate Government,

Affirming the commitment of all Member States to the sovereignty, territorial integrity and political independence of Kuwait and Iraq, and noting the intention expressed by the Member States cooperating with Kuwait under paragraph 2 of resolution 678 (1990) to bring their military presence in Iraq to an end as soon as possible consistent with paragraph 8 of resolution 686 (1991),

Reaffirming the need to be assured of Iraq's peaceful intentions in the light of its unlawful invasion and occupation of Kuwait,

Taking note of the letter sent by the Minister for Foreign Affairs of Iraq on 27 February 1991 and those sent pursuant to resolution 686 (1991),

Noting that Iraq and Kuwait, as independent sovereign States, signed at Baghdad on 4 October 1963 "Agreed Minutes Between the State of Kuwait and the Republic of Iraq Regarding the Restoration of Friendly Relations, Recognition and Related Matters", thereby recognizing formally the boundary between Iraq and Kuwait and the allocation of islands, which were registered with the United Nations in accordance with Article 102 of the Charter of the United Nations and in which Iraq recognized the independence and complete sovereignty of the State of Kuwait within its borders as specified and accepted in the

letter of the Prime Minister of Iraq dated 21 July 1932, and as accepted by the Ruler of Kuwait in his letter dated 10 August 1932,

Conscious of the need for demarcation of the said boundary,

Conscious also of the statements by Iraq threatening to use weapons in violation of its obligations under the Geneva Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare, signed at Geneva on 17 June 1925, and of its prior use of chemical weapons and affirming that grave consequences would follow any further use by Iraq of such weapons,

Recalling that Iraq has subscribed to the Declaration adopted by all States participating in the Conference of States Parties to the 1925 Geneva Protocol and Other Interested States, held in Paris from 7 to 11 January 1989, establishing the objective of universal elimination of chemical and biological weapons,

Recalling also that Iraq has signed the Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction, of 10 April 1972,

Noting the importance of Iraq ratifying this Convention,

Noting moreover the importance of all States adhering to this Convention and encouraging its forthcoming Review Conference to reinforce the authority, efficiency and universal scope of the Convention,

Stressing the importance of an early conclusion by the Conference on Disarmament of its work on a Convention on the Universal Prohibition of Chemical Weapons and of universal adherence thereto,

Aware of the use by Iraq of ballistic missiles in unprovoked attacks and therefore of the need to take specific measures in regard to such missiles located in Iraq,

Concerned by the reports in the hands of Member States that Iraq has attempted to acquire materials for a nuclear-weapons programme contrary to its obligations under the Treaty on the Non-Proliferation of Nuclear Weapons of 1 July 1968,

Recalling the objective of the establishment of a nuclear-weapons-free zone in the region of the Middle East,

Conscious of the threat that all weapons of mass destruction pose to peace and security in the area and of the need to work towards the establishment in the Middle East of a zone free of such weapons,

Conscious also of the objective of achieving balanced and comprehensive control of armaments in the region,

Conscious further of the importance of achieving the objectives noted above using all available means, including a dialogue among the States of the region,

Noting that resolution 686 (1991) marked the lifting of the measures imposed by resolution 661 (1990) in so far as they applied to Kuwait,

Noting that despite the progress being made in fulfilling the obligations of resolution 686 (1991), many Kuwaiti and third country nationals are still not accounted for and property remains unreturned,

Recalling the International Convention against the Taking of Hostages, opened for signature at New York on 18 December 1979, which categorizes all acts of taking hostages as manifestations of international terrorism,

Deploring threats made by Iraq during the recent conflict to make use of terrorism against targets outside Iraq and the taking of hostages by Iraq,

Taking note with grave concern of the reports of the Secretary-General of 20 March 1991 and 28 March 1991, and conscious of the necessity to meet urgently the humanitarian needs in Kuwait and Iraq,

Bearing in mind its objective of restoring international peace and security in the area as set out in recent resolutions of the Security Council,

Conscious of the need to take the following measures acting under Chapter VII of the Charter,

1 *Affirms* all thirteen resolutions noted above, except as expressly changed below to achieve the goals of this resolution, including a formal cease-fire;

A

2 *Demands* that Iraq and Kuwait respect the inviolability of the international boundary and the allocation of islands set out in the "Agreed Minutes Between the State of Kuwait and the Republic of Iraq Regarding the Restoration of Friendly Relations, Recognition and Related Matters", signed by them in the exercise of their sovereignty at Baghdad on 4 October 1963 and registered with the United Nations and published by the United Nations in document 7063, United Nations, *Treaty Series*, 1964;

3 *Calls upon* the Secretary-General to lend his assistance to make arrangements with Iraq and Kuwait to demarcate the boundary between Iraq and Kuwait, drawing on appropriate material, including the map

transmitted by Security Council document S/22412 and to report back to the Security Council within one month;

4 *Decides* to guarantee the inviolability of the above-mentioned international boundary and to take as appropriate all necessary measures to that end in accordance with the Charter of the United Nations;

B

5 *Requests* the Secretary-General, after consulting with Iraq and Kuwait, to submit within three days to the Security Council for its approval a plan for the immediate deployment of a United Nations observer unit to monitor the Khor Abdullah and a demilitarized zone, which is hereby established, extending ten kilometres into Iraq and five kilometres into Kuwait from the boundary referred to in the "Agreed Minutes Between the State of Kuwait and the Republic of Iraq Regarding the Restoration of Friendly Relations, Recognition and Related Matters" of 4 October 1963; to deter violations of the boundary through its presence in and surveillance of the demilitarized zone; to observe any hostile or potentially hostile action mounted from the territory of one State to the other; and for the Secretary-General to report regularly to the Security Council on the operations of the unit, and immediately if there are serious violations of the zone or potential threats to peace;

6 *Notes* that as soon as the Secretary-General notifies the Security Council of the completion of the deployment of the United Nations observer unit, the conditions will be established for the Member States cooperating with Kuwait in accordance with resolution 678 (1990) to bring their military presence in Iraq to an end consistent with resolution 686 (1991);

C

7 *Invites* Iraq to reaffirm unconditionally its obligations under the Geneva Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare, signed at Geneva on 17 June 1925, and to ratify the Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction, of 10 April 1972;

8 *Decides* that Iraq shall unconditionally accept the destruction, removal, or rendering harmless, under international supervision, of:

a All chemical and biological weapons and all stocks of agents and all related subsystems and components and all research, development, support and manufacturing facilities;

b All ballistic missiles with a range greater than 150 kilometres and related major parts, and repair and production facilities;

9 *Decides*, for the implementation of paragraph 8 above, the following:

a Iraq shall submit to the Secretary-General, within fifteen days of the adoption of the present resolution, a declaration of the locations, amounts and types of all items specified in paragraph 8 and agree to urgent, on-site inspection as specified below;

b The Secretary-General, in consultation with the appropriate Governments and, where appropriate, with the Director-General of the World Health Organization, within forty-five days of the passage of the present resolution, shall develop, and submit to the Council for approval, a plan calling for the completion of the following acts within forty-five days of such approval:

i The forming of a Special Commission, which shall carry out immediate on-site inspection of Iraq's biological, chemical and missile capabilities, based on Iraq's declarations and the designation of any additional locations by the Special Commission itself;

ii The yielding by Iraq of possession to the Special Commission for destruction, removal or rendering harmless, taking into account the requirements of public safety, of all items specified under paragraph 8 (a) above, including items at the additional locations designated by the Special Commission under paragraph 9 (b) (i) above and the destruction by Iraq, under the supervision of the Special Commission, of all its missile capabilities, including launchers, as specified under paragraph 8 (b) above;

iii The provision by the Special Commission of the assistance and cooperation to the Director-General of the International Atomic Energy Agency required in paragraphs 12 and 13 below;

10 *Decides* that Iraq shall unconditionally undertake not to use, develop, construct or acquire any of the items specified in paragraphs 8 and 9 above and requests the Secretary-General, in consultation with the Special Commission, to develop a plan for the future ongoing monitoring and verification of Iraq's compliance with this paragraph, to be submitted to the Security Council for approval within one hundred and twenty days of the passage of this resolution;

11 *Invites* Iraq to reaffirm unconditionally its obligations under the Treaty on the Non-Proliferation of Nuclear Weapons of 1 July 1968;

12 *Decides* that Iraq shall unconditionally agree not to acquire or develop nuclear weapons or nuclear-weapons-usable material or any subsystems or components or any research, development, support or manufacturing facilities related to the above; to submit to the Secretary-General and the Director-General of the International Atomic Energy Agency within fifteen days of the adoption of the present resolution a declaration of the locations, amounts, and types of all items specified above; to place all of its nuclear-weapons-usable materials under the exclusive control, for custody and removal, of the International Atomic Energy Agency, with the assistance and cooperation of the Special Commission as provided for in the plan of the Secretary-General discussed in paragraph 9 (b) above; to accept, in accordance with the arrangements provided for in paragraph 13 below, urgent on-site inspection and the destruction, removal or rendering harmless as appropriate of all items specified above; and to accept the plan discussed in paragraph 13 below for the future ongoing monitoring and verification of its compliance with these undertakings;

13 *Requests* the Director-General of the International Atomic Energy Agency, through the Secretary-General, with the assistance and cooperation of the Special Commission as provided for in the plan of the Secretary-General in paragraph 9 (b) above, to carry out immediate on-site inspection of Iraq's nuclear capabilities based on Iraq's declarations and the designation of any additional locations by the Special Commission; to develop a plan for submission to the Security Council within forty-five days calling for the destruction, removal, or rendering harmless as appropriate of all items listed in paragraph 12 above; to carry out the plan within forty-five days following approval by the Security Council; and to develop a plan, taking into account the rights and obligations of Iraq under the Treaty on the Non-Proliferation of Nuclear Weapons of 1 July 1968, for the future ongoing monitoring and verification of Iraq's compliance with paragraph 12 above, including an inventory of all nuclear material in Iraq subject to the Agency's verification and inspections of the International Atomic Energy Agency to confirm that the Agency's safeguards cover all relevant nuclear activities in Iraq, to be submitted to the Security Council for approval within one hundred and twenty days of the passage of the present resolution;

14 *Takes note* that the actions to be taken by Iraq in paragraphs 8, 9, 10, 11, 12 and 13 of the present resolution represent steps towards the

goal of establishing in the Middle East a zone free from weapons of mass destruction and all missiles for their delivery and the objective of a global ban on chemical weapons;

D

15 *Requests* the Secretary-General to report to the Security Council on the steps taken to facilitate the return of all Kuwaiti property seized by Iraq, including a list of any property that Kuwait claims has not been returned or which has not been returned intact;

E

16 *Reaffirms* that Iraq, without prejudice to the debts and obligations of Iraq arising prior to 2 August 1990, which will be addressed through the normal mechanisms, is liable under international law for any direct loss, damage, including environmental damage and the depletion of natural resources, or injury to foreign Governments, nationals and corporations, as a result of Iraq's unlawful invasion and occupation of Kuwait;

17 *Decides* that all Iraqi statements made since 2 August 1990 repudiating its foreign debt are null and void, and demands that Iraq adhere scrupulously to all of its obligations concerning servicing and repayment of its foreign debt;

18 *Decides also* to create a fund to pay compensation for claims that fall within paragraph 16 above and to establish a Commission that will administer the fund;

19 *Directs* the Secretary-General to develop and present to the Security Council for decision, no later than thirty days following the adoption of the present resolution, recommendations for the fund to meet the requirement for the payment of claims established in accordance with paragraph 18 above and for a programme to implement the decisions in paragraphs 16, 17 and 18 above, including: administration of the fund; mechanisms for determining the appropriate level of Iraq's contribution to the fund based on a percentage of the value of the exports of petroleum and petroleum products from Iraq not to exceed a figure to be suggested to the Council by the Secretary-General, taking into account the requirements of the people of Iraq, Iraq's payment capacity as assessed in conjunction with the international financial institutions taking into consideration external debt service, and the needs of the Iraqi economy; arrangements for ensuring that payments are made to the fund; the process by which funds will be allocated and claims paid; appropriate procedures for evaluating losses, listing claims and verifying their validity and resolving disputed claims in respect of

Iraq's liability as specified in paragraph 16 above; and the composition of the Commission designated above;

F

20 *Decides*, effective immediately, that the prohibitions against the sale or supply to Iraq of commodities or products, other than medicine and health supplies, and prohibitions against financial transactions related thereto contained in resolution 661 (1990) shall not apply to foodstuffs notified to the Security Council Committee established by resolution 661 (1990) concerning the situation between Iraq and Kuwait or, with the approval of that Committee, under the simplified and accelerated "no-objection" procedure, to materials and supplies for essential civilian needs as identified in the report of the Secretary-General dated 20 March 1991, and in any further findings of humanitarian need by the Committee;

21 *Decides* that the Security Council shall review the provisions of paragraph 20 above every sixty days in the light of the policies and practices of the Government of Iraq, including the implementation of all relevant resolutions of the Security Council, for the purpose of determining whether to reduce or lift the prohibitions referred to therein;

22 *Decides* that upon the approval by the Security Council of the programme called for in paragraph 19 above and upon Council agreement that Iraq has completed all actions contemplated in paragraphs 8, 9, 10, 11, 12 and 13 above, the prohibitions against the import of commodities and products originating in Iraq and the prohibitions against financial transactions related thereto contained in resolution 661 (1990) shall have no further force or effect;

23 *Decides* that, pending action by the Security Council under paragraph 22 above, the Security Council Committee established by resolution 661 (1990) shall be empowered to approve, when required to assure adequate financial resources on the part of Iraq to carry out the activities under paragraph 20 above, exceptions to the prohibition against the import of commodities and products originating in Iraq;

24 *Decides* that, in accordance with resolution 661 (1990) and subsequent related resolutions and until a further decision is taken by the Security Council, all States shall continue to prevent the sale or supply, or the promotion or facilitation of such sale or supply, to Iraq by their nationals, or from their territories or using their flag vessels or aircraft, of:

a Arms and related *matériel* of all types, specifically including the sale or transfer through other means of all forms of conventional military equipment, including for paramilitary forces, and spare parts and components and their means of production, for such equipment;

b Items specified and defined in paragraphs 8 and 12 above not otherwise covered above;

c Technology under licensing or other transfer arrangements used in the production, utilization or stockpiling of items specified in subparagraphs (a) and (b) above;

d Personnel or materials for training or technical support services relating to the design, development, manufacture, use, maintenance or support of items specified in subparagraphs (a) and (b) above;

25 *Calls upon* all States and international organizations to act strictly in accordance with paragraph 24 above, notwithstanding the existence of any contracts, agreements, licences or any other arrangements;

26 *Requests* the Secretary-General, in consultation with appropriate Governments, to develop within sixty days, for the approval of the Security Council, guidelines to facilitate full international implementation of paragraphs 24 and 25 above and paragraph 27 below, and to make them available to all States and to establish a procedure for updating these guidelines periodically;

27 *Calls upon* all States to maintain such national controls and procedures and to take such other actions consistent with the guidelines to be established by the Security Council under paragraph 26 above as may be necessary to ensure compliance with the terms of paragraph 24 above, and calls upon international organizations to take all appropriate steps to assist in ensuring such full compliance;

28 *Agrees* to review its decisions in paragraphs 22, 23, 24 and 25 above, except for the items specified and defined in paragraphs 8 and 12 above, on a regular basis and in any case one hundred and twenty days following passage of the present resolution, taking into account Iraq's compliance with the resolution and general progress towards the control of armaments in the region;

29 *Decides* that all States, including Iraq, shall take the necessary measures to ensure that no claim shall lie at the instance of the Government of Iraq, or of any person or body in Iraq, or of any person claiming through or for the benefit of any such person or body, in connection with any contract or other transaction where its performance was affected by

reason of the measures taken by the Security Council in resolution 661 (1990) and related resolutions;

G

30 *Decides* that, in furtherance of its commitment to facilitate the repatriation of all Kuwaiti and third country nationals, Iraq shall extend all necessary cooperation to the International Committee of the Red Cross, providing lists of such persons, facilitating the access of the International Committee of the Red Cross to all such persons wherever located or detained and facilitating the search by the International Committee of the Red Cross for those Kuwaiti and third country nationals still unaccounted for;

31 *Invites* the International Committee of the Red Cross to keep the Secretary-General apprised as appropriate of all activities undertaken in connection with facilitating the repatriation or return of all Kuwaiti and third country nationals or their remains present in Iraq on or after 2 August 1990;

H

32 *Requires* Iraq to inform the Security Council that it will not commit or support any act of international terrorism or allow any organization directed towards commission of such acts to operate within its territory and to condemn unequivocally and renounce all acts, methods and practices of terrorism;

I

33 *Declares* that, upon official notification by Iraq to the Secretary-General and to the Security Council of its acceptance of the provisions above, a formal cease-fire is effective between Iraq and Kuwait and the Member States cooperating with Kuwait in accordance with resolution 678 (1990);

34 *Decides* to remain seized of the matter and to take such further steps as may be required for the implementation of the present resolution and to secure peace and security in the area.

Recent Books and Articles

Alagappa, Muthiah, ed. *Building Confidence, Resolving Conflicts: Proceedings of the Second Asia-Pacific Roundtable*. London, Kegan Paul International for the Institute of Strategic and International Studies (ISIS), Malaysia, 1989. 155 p.

Building Confidence, Resolving Conflicts is a compilation of the papers presented at the Second Asia-Pacific Roundtable, held at Kuala Lumpur from 1 to 4 July 1988. The Asia-Pacific Roundtable—inaugurated in Manila in September 1985—was instituted by the Institute of Strategic and International Studies (ISIS), Malaysia, to provide a forum in which participants from all sectors and countries in the region could exchange views on peace and security and explore proposals and measures to build confidence and reduce conflict in the Pacific region. Its second meeting brought together more than 100 eminent scholars and officials to discuss confidence building and conflict resolution in the Pacific which, in the words of the conference's keynote speaker, Dato' Abu Hassan Omar, represents "a major preoccupation confronting most governments today and which poses serious challenges for the future".

The Second Asia-Pacific Roundtable examined, *inter alia*, varying aspects of the problems of and prospects for arms control, confidence building and conflict resolution in the Asia-Pacific region, including prospects for super-Power rapprochement in the Pacific.

In a separate chapter, Mohamed Noordin Sopiee, Director General of ISIS, offers his personal view of the Cambodian conflict.

"Arms Control: Thirty Years On". *Daedalus*, Winter 1991, vol. 120, No.1. 272 p.

This issue of the quarterly periodical *Daedalus* is devoted entirely to the subject of arms control. The contributors have been asked to respond to the following questions: Do classic arms control ideas (still) make sense? Has arms control increased United States security, and if so, why? How has the world changed since 1960? What should be the nature, goals, and means of arms control agreements in the future?

The authors have also been asked to think about arms control, not only as technical measures for avoiding war, but also as a peace-management technique. They have come up with ideas about incentives, alternative deterrence postures, new institutionalized forums of communication and consultation, regulation of peaceful competition, and the extension of arms control to the third world.

The fifteen contributors include: Emanuel Adler, Robert R. Bowie, Ashton B. Carter, Paul Doty, Lawrence Freedman, Johan Jorgen Holst, Robert Jervis, Catherine M. Kelleher, A. A. Kokoshin, Joseph S. Nye, Jr., Barry R. Posen, Thomas C. Schelling, Jennifer E. Sims, Marc Trachtenberg, and Steve Weber.

Ball, Desmond, ed. *Australia and the World: Prologue and Prospects*. Canberra, Strategic and Defence Studies Centre, Australian National University, 1990. 470 p. (Canberra Papers on Strategy and Defence, No. 69)

The volume consists of the revised and edited versions of papers presented to a major international conference organized by the Strategic and Defence Studies Centre and held at the Australian National University in Canberra in December 1988 to examine Australia's current defence and security environment and to assess its future prospects.

In part I, as an introduction to the papers, John Molony, a professor of Australian history, reviews Australia's historical legacy and its development as a nation. Among those examining Australia's current circumstances and prospects in the global context in part II is Desmond Ball, Head of the Strategic and Defence Studies Centre and editor of the book. In his contribution he provides a detailed assessment of Australia and the global strategic balance. In part III, contributors focus on Australia's place in the world and emphasize its political and strategic relationships in the Indian Ocean, South-East Asia and the south-west Pacific, including Papua New Guinea. In part IV, which addresses Australia's domestic security policies and capabilities, Richard Butler, Australia's former Ambassador for Disarmament, details the main elements of his country's disarmament policy 1984-1990 and offers some views and speculations for the years ahead. An extensive bibliography is annexed to the volume.

Brown, James. *Delicately Poised Allies: Greece and Turkey, Problems, Policy Choices and Mediterranean Security*. London, Brassey's, 1991. 184 p.

This book examines the internal politics of Greece and Turkey and their political and national security policies. Their roles in NATO are also addressed. Of particular interest, though not the book's major focus, is a chapter on the effect the Treaty on Conventional Forces in Europe will have on the force structure and military planning of Greece and Turkey.

Calogero, Francesco, Marvin L. Goldberger and Sergei P. Kapitza, eds. *Verification: Monitoring Disarmament*. Boulder, Colorado, Westview Press, 1991. 266 p.

This book is the combined effort of 33 experts—from Europe, the Soviet Union and the United States—on the question of verification. The chapters include jointly authored essays detailing the breakthroughs and failures of the current verification system, its purpose in terms of diplomacy, and possible future scenarios.

The material contained in this book is a reflection of the Pugwash Conferences as expressed by its participants. All of the contributors, including the three editors, are regular participants in the Pugwash Conferences, which have as their aim to unite noted experts in their respective fields in a setting which enables them to act as individuals rather than as representatives of any particular Government.

There are twelve chapters in this work, dealing with topics directly related to the issues of verification and disarmament. Also included is an annotated bibliography prepared by Itshak Lederman of Israel.

Cohen, Stephen Philip, ed. *Nuclear Proliferation in South Asia: Prospects for Arms Control*. Boulder, Colorado, Westview Press, 1991. 377 p.

In this, his second book on nuclear proliferation in South Asia, Stephen P. Cohen suggests new ways in which the United States can encourage the prevention, limitation or containment of nuclear proliferation in the area. The book, which is based on a regional verification study completed in 1990 for the Los Alamos National Laboratory, represents the author's attempt to understand and explain the technical and policy dynamics of regional proliferation that confront both American and South Asian scholars and policy makers. Together with a small

group of highly qualified experts and scholars, he undertook to find the answer to the somewhat unconventional question, "What combination of political agreements and technical arrangements would make it possible for India and Pakistan *not* to go nuclear?" While the author concedes that the book may not provide an answer to the question, it is, in his view, an attempt to explore and explain what has accelerated a weaponization process in South Asia. In the author's opinion, the central goal of United States policy should be to see that other attractive options to nuclear weapons exist in the region.

Darnton, Geoffrey. *The Bomb and the Law: London Nuclear Warfare Tribunal, Evidence, Commentary and Judgment: A Summary Report*. Stockholm, Sweden, The Alva and Gunnar Myrdal Foundation and Swedish Lawyers Against Nuclear Arms, 1989.

This book provides a collection of articles and commentaries on questions concerning the legality of nuclear weapons prepared from the perspective of the Nuclear Warfare Tribunal that sat in London from 2 to 6 January 1985 under the Chairmanship of Sean MacBride. This Tribunal was set up at the initiative of a member of non-governmental organizations, including the Green Party of Great Britain, British Lawyers for Nuclear Disarmament and the International Peace Bureau. The book is a summary of the material presented to the Tribunal as compiled by the editor.

An introductory chapter discusses the relevance of international law and the substantive foundations that relate to the issues before the Tribunal, including the "just war" doctrine, customary norms of international law, treaty rules and principles, and supplementary norms with legal force. Chapter 2 summarizes specific ways in which various international legal instruments, including the Hague conventions of 1907, the Geneva Protocol of 1925, the Nuremburg Judgement and the Genocide Convention of 1948, may be relevant to the subject of inquiry. Other chapters discuss the way international law applies to the question of the possession of nuclear weapons and to the question of the use of nuclear weapons. The book ends with the text of the conclusions of the London Nuclear Warfare Tribunal and several additional texts in appendices, including the text of the Nuremburg Principles and the McCloy-Zorin Accords.

Denver Journal of International Law and Policy, vol. 19, No. 1 (Fall 1990). 271 p.

This issue of the *Denver Journal* devotes its largest section to seven papers on nuclear weapons and the right to survival, peace and development. In a lead article, Professor Christopher Weeramantry analyses law and nuclear weapons in a "real world" context and concludes that there are sufficient rules of international law pointing to nuclear weapons being illegal, and he recommends that the International Court of Justice be asked to give an advisory opinion on the subject. In another article, Jayantha Dhanapala of UNIDIR discusses the obligations assumed by States in a number of arms control and disarmament treaties. In an article on "Fundamental Rights and Nuclear Arms", Theo Van Boven says that several recent studies and statements have promoted the concept that human rights include freedom from threats to humanity, such as excessive armaments and destruction of the environment, and that there is a developing notion that obligations and entitlements of international law pertain to peoples and individuals as well as to States.

Deveroux, Tony. *Messenger Gods of Battle*. London, Brassey's, 1991. 332 p.

Messenger Gods of Battle reviews the use of electronics in war. The intended audience of the book, the non-specialist, is well served by the clearly written text of the author, Tony Deveroux. The numerous plates, maps, figures and tables succeed in making the text engaging and the descriptions of the technologies understandable without overwhelming the reader.

Deveroux does not attempt to catalogue all radio and radar equipment, but rather provides examples of certain technologies and their military role. When appropriate, a brief discussion of the political and military landscape is provided. The book begins with an examination of electronic warfare in the nineteenth and twentieth centuries. The bulk of the book is devoted to a review of the use of electronics during World War II. The post-war period is addressed in the last three chapters of the book. The book points "to the need for electronic warfare to take its place along with nuclear weaponry in international disarmament treaties".

Geissler, Erhard, and Robert H. Haynes, eds. *Prevention of a Biological and Toxin Arms Race and the Respon-*

sibility of Scientists. Berlin, Akademie-Verlag, 1991. 517 p.

In this volume the editors have compiled contributions from experts in various fields of the natural and social sciences who addressed the XIth Kuhlönsborn Colloquium on "Prevention of a Biological and Toxin Arms Race and the Responsibility of Scientists", held in September 1990. A number of additional papers not presented at the Colloquium are also included.

The papers have been organized under the following chapter headings: Historical aspects [of biological warfare]; Promotion of biotechnology for peaceful purposes in third world countries; What can be learned from the negotiations on a chemical weapons convention; Confidence-building measures; Verification measures; Legal approaches for strengthening the biological weapons convention; The responsibility of scientists; and Proposals to strengthen the BW Convention.

Gottfried, Kurt and Paul Bracken, eds. *Reforging European Security: From Confrontation to Cooperation*. Boulder, Colorado, Westview Press, 1990. 226 p.

Reforging European Security is a collection of essays analysing the political and military implications of German unification and of the changes in the Soviet Union for NATO and the United States. In their introductory essay, the editors, Kurt Gottfried, a professor of Physics and Nuclear Studies at Cornell University, and Paul Bracken, a professor of Public Policy at Yale University, assert that while "the long term role of NATO is unclear", NATO remains "viable and robust at least in the near term". They also contend that "a complex web of diplomatic and institutional bonds is forming between Western and Eastern Europe".

The contributors include Jonathan Dean, Lloyd R. Leavitt, Jr., Wallace H. Nutting and Stanley R. Resor. The book also contains the speech given by General Secretary Mikhail Gorbachev at the United Nations General Assembly on 8 December 1988, the address given by former Foreign Minister Eduard Shevardnadze at the Conventional Forces in Europe Negotiations on 6 March 1989; the address given by Secretary of State James Baker to the Berlin Press Club on 12 December 1989; the Declaration by NATO Heads of State following the London Summit held on 5-6 July 1990; and the statements made by Chancellor Helmut Kohl and President Mikhail Gorbachev to a news conference in Zheleznovodsk on 16 July 1990.

Lepgold, Joseph. *The Declining Hegemon. The United States and European Defense, 1960-1990*. New York, Greenwood Press, 1990. 225 p.

Joseph Lepgold, an assistant professor of Government and International Affairs at Georgetown University, reviews the rationale for the American defence commitment to Europe between 1960 and 1980 and provides a theory of the policy adaptation that States undergo in hegemonic decline. With respect to the United States, he contends that foreign policy makers knowingly undertook military commitments which overextended its economic and social substructure in order to maintain its military position *vis-à-vis* the Soviet Union. He presents data which suggest that United States power capabilities have declined in comparison to the global economy, particularly in the areas of national income, crude petroleum, iron ore and wheat production. After systematically analysing the three-decades-old military rationale for the United States presence in Europe, he suggests ways by which the present United States military commitments in Europe might be revised to reflect the present post-cold-war situation.

Mayers, Teena Karsa. *Understanding Weapons and Arms Control: A Guide to the Issues*, 4th. ed. rev. Washington, D.C., Brassey's (US), Inc., 1991. 146 p.

Teena Karsa Mayers, a former Administrator of Special Projects with the United States Arms Control and Disarmament Agency, devised this simple, colourfully illustrated, easy-to-read guide to the more complex topic of arms control. Assembled from United States Government publications and other materials in the public domain, the guide, now in its fourth edition, includes a brief history of the nuclear arms race, a listing of facts on the basics of arms control, a review of the current status of bilateral arms control negotiations, basic information on existing treaties and agreements and, in a final section, a synopsis of the effects of nuclear war.

Munro, Neil. *The Quick and the Dead: Electronic Combat and Modern Warfare*. New York, St. Martin's Press, 1991. 324 p.

In his book *The Quick and the Dead*, Neil Munro draws attention to the critical importance of electronic combat—a category of warfare which, he believes, receives too little attention. Stated simply, electronic combat is the struggle for use of the electromagnetic spectrum to gain

the upper hand in collecting intelligence, exchanging messages and identifying targets. According to Munro, "Just as control of vital sea lanes allowed Britain to dominate the world for most of the 1800s, so will control of the electromagnetic spectrum allow armies to dominate local wars now and in the future." He stresses, "[T]he principal point about information is that even a little can have enormous consequences."

Despite the technical nature of the subject-matter, the book is written for the lay person. The technology is described in plain language and provides an accessible overview of the techniques and tactics of electronic combat.

Orbis, Winter 1991, vol. 35, No. 1. 160 p.

Four articles in this issue deal with arms control and disarmament. Three, written by Kathleen C. Bailey, Mark A. Heller, and Uzi Rubin, respectively, address the question of the proliferation of ballistic missiles. A fourth contributor to the periodical, Ron Matthews, focuses on arms transfers by neutral States.

Sharp, Jane M. O., ed. *Europe After an American Withdrawal: Economic and Military Issues*. New York, Oxford University Press/SIPRI, 1990. 501 p.

This book, edited by Jane Sharp, a Senior Researcher at the Stockholm International Peace Research Institute, assesses the ramifications of an American military withdrawal from Europe. Several factors are taken into account: European sensitivities; intelligence gathering; the field of communications; command and control; and the ability of the United States and Europe to weather their changing relationship.

The editor has organized the works of 22 governmental and academic experts on both sides of the Atlantic into four sections: an overview; economic implications; military implications; and coping without a United States presence. She attempts to discern the likely outcome of two hypothetical scenarios: the first has United States forces entirely withdrawn without any commitment to a future presence; the second allows for a justifiable basic or minimal presence with the promise of escalation in support of NATO should the need arise.

This book represents the second volume issued by SIPRI for the purpose of discussing the future of United States and Western European relations. In the first, *United States Military Forces and Installations in Europe*, Simon Duke traced the history of the United States military presence in Europe.

Sims, Nicholas A. *Reinforcing Biological Disarmament: Issues in the 1991 Review*. London, England, Centre for Defence Studies, Kings College, University of London, 1991. 28 p.

This booklet, by a British scholar who has followed the fate of the Biological Weapons Convention from the beginning, examines its prospects for the future starting with an analysis of the obligations of States parties and the significance of the first two Review Conferences. Published eight months before the Third Review Conference of the parties to the Convention, the paper states that the review will have to decide whether to confine itself to agreeing a further set of voluntary confidence-building measures, or to move into the hitherto uncharted area of additional protocols with new, legally binding obligations, or to combine the two approaches.

Specific ideas discussed include the greater use of WHO reporting procedures, declarations by Governments of any offensive BW involvement in the past and the use of microbiologists to help generate confidence in the peaceful nature of one another's work with dangerous pathogens by undertaking exchanges between research establishments. Another confidence-building measure recommended, which was also put forward at the Second Review Conference in 1986, is to have States parties declare in full their military immunization programmes. The booklet also considers the practical feasibility of intrusive verification procedures, now that earlier political barriers no longer exist. The final part of the paper discusses the possibility of institutions of a semi-permanent character to "give the Convention a better chance of resisting any future erosion of confidence in its effectiveness or any future assault on its integrity". These might include, the author states, a committee of oversight, a scientific advisory panel, a legal advisory panel and a secretariat, either within the United Nations Department for Disarmament Affairs, or within the foreign ministry of whichever State occupied the presidency of the preceding Review Conference.

Staar, Richard F. *Foreign Policies of the Soviet Union*. Stanford, California, Hoover Institution Press, 1991. 351 p.

In his book, Richard Staar, a Senior Fellow at the Hoover Institution and former United States Ambassador to the Mutual and Balance Force Reduction talks in Vienna (1981-83), puts contemporary events concerning Soviet foreign policy into historical perspective. The

book explores the foundations of Soviet foreign policy and the Soviet decision-making process. The author also examines the way in which recent changes in international relations have affected Soviet foreign policy in specific geographical regions. A final chapter looks at varying aspects of the complex Soviet-American relationship. An extensive bibliography of Russian- and non-Russian-language sources is included.

Westing, Arthur H., ed. *Environmental Hazards of War*. London, Sage, 1990. 96 p.

This is the second work headed by Westing in a projected series of books exploring the various ramifications of peace, environment and security (the initial volume being *Global Resources and Environmental Conflict: Environmental Factors in Strategic Policy and Action*; New York, Oxford University Press, 1986.) In this book the environmental damage likely to occur in the event of a major war is explored. Rapidly increasing development and industrialization, it is argued, have created potentially calamitous conditions. Thus, conventional weapons employed against civilian targets, such as nuclear power and chemical plants and dams—whether intentional or inadvertent—could result in the release of radioactive or toxic chemicals or impounded waters.

The editor of the book and four other experts have contributed short papers on the potential hazards outlined above. Legal, political and cultural efforts to mitigate the danger are also addressed. A series of appendices highlight relevant publications and multilateral agreements and declarations.

Wettig, Gerhard, ed. *Die sowjetische Militärmacht und die Stabilität in Europa*. (Soviet Military Power and Stability in Europe). Baden-Baden: Nomos Verlagsgesellschaft, 1990. 207 p.

Written under the auspices of the Bundesinstitut für ostwissenschaftliche und internationale Studien (the Federal Institute for East- and International Studies) in Cologne, Germany, the book comprises six essays analysing the military capabilities of the Warsaw Pact and the Soviet Union. The study is motivated by the question whether recent discussion in the Soviet Union of the concepts of non-offensive defence and military sufficiency justify hopes for stability in Europe on a basis other than that of nuclear deterrence. The study offers an optimistic prognosis for further developments in East-West relations in Europe. The editor, Gerhard Wettig, concludes that the USSR will

maintain its position, renouncing nuclear deterrence and instituting further cuts in its conventional offensive capabilities in Europe, long considered by NATO countries as numerically superior to theirs.

Further Publications

Disarmament is unable to publish reviews of all books and articles which have been sent to the Editor. The following is a list of items received recently.

- Allan, Richard. *Terrorism: Pragmatic International Deterrence and Cooperation*. New York, Institute for East-West Security Studies, 1990. 70 p. (Occasional Paper Series 19)
- Arkin, William M., et al. *U.S. Nuclear Weapons in the Persian Gulf Crisis*. Washington, D.C., Greenpeace USA, January 1991, 29 p.
- Bennett, F. N. *The Amateur Managers: A Study of the Management of Weapons System Projects*. Canberra, Strategic and Defence Studies Centre, Research School of Pacific Studies, Australian National University, 1990. 216 p. (Canberra Papers on Strategy and Defence No. 67)
- Brzoska, Michael. *Military Trade, Aid and Developing Country Debt*. Hamburg, Unit for the Study of Wars, Armaments and Development, 1990. 64 p. (Working Papers 48)
- Chemical Weapons and Security in the Middle East*. Washington, D.C., Program on Science and International Security, American Association for the Advancement of Science, 1990. 35 p.
- Chernega, Vladimir N. *Conversion: Its Goals and Prospects*. Monterey, California, Monterey Institute of International Studies, Global Peace and Security Program, November 1990. 16 p. (GPSP Research Note No. 2)
- Findlay, Trevor. *Asia/Pacific CSBMs: A Prospectus*. Canberra, Peace Research Centre, Australian National University, August 1990. 32 p. (Working Paper No. 90)
- Gansler, Jacques S. *Affording Defense*. Cambridge, Massachusetts, The MIT Press, 1989. 417 p.
- George, Paul. *Indian Naval Expansion*. Ottawa, Canadian Institute for International Peace and Security, February 1991. 37 p. (Working Paper 32)

- Graybeal, Sidney N. *SDI and the ABM Treaty*. Washington, D.C., Program on Science and International Security, American Association for the Advancement of Science, 1988. 11 p.
- Implementing a Global Chemical Weapons Convention*. Washington, D.C., Program on Science and International Security, American Association for the Advancement of Science, 1989. 36 p.
- Implications of Smaller Defense Budgets for the U.S. Economy and National Security*. Washington, D.C., Program on Science and International Security, American Association for the Advancement of Science, 1990. 40 p.
- Jónsson, Albert. *Iceland, NATO and the Keflavik Base*. Reykjavik, Icelandic Commission on Security and International Affairs, 1989. 110 p.
- Kevin, A. C. *Southeast Asia Beyond the Cambodia Settlement: Sources of Political and Economic Tensions and Conflict, Trends in Defense Spending, and Options for Cooperative Engagement*. Canberra, Strategic and Defence Studies Centre, September 1990. 29 p. (Working Paper No. 216)
- Klintworth, Gary. *Cambodia and Peacekeeping: 1990*. Canberra, Strategic and Defence Studies Centre, August 1990. 17 p. (Working Paper No. 210)
- Klintworth, Gary. *Iraq: International Law Aspects*. Canberra, Strategic and Defence Studies Centre, September 1990. 16 p. (Working Paper No. 216)
- Klintworth, Gary. *Vietnam's Strategic Outlook*. Canberra, Strategic and Defence Studies Centre, September 1990. 15 p. (Working Paper No. 217)
- Langmore, John. *Increasing Security in the East Asia-Pacific Region*. Canberra, Peace Research Centre, Australian National University, October 1990. 10 p. (Working Paper No. 95)
- Luckham, Robin. *American Militarism and the Third World: The End of the Cold War?* Canberra, Peace Research Centre, Australian National University, October 1990. 66 p. (Working Paper No. 94)
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